

THE AMERICAN JOURNAL OF PHARMACY

MARCH, 1895.

STRUCTURE OF CIMICIFUGA.

BY EDSON S. BASTIN.

Cimicifuga racemosa, *Nuttall*, the source of the drug, is a native of the eastern portion of Canada and of the United States, extending as far south as Florida. It is a large, perennial, smooth herb, whose wand-like stem often attains a height of seven or eight feet, is leafy only near its middle, where it bears several large petiolate, triternate leaves, the leaflets of which are ovate or ovate oblong, acute and deeply serrate-toothed. The white flowers are borne in long, terminal, erect racemes which attain a length of from eight inches to three feet; the four or five small sepals fall when the flower opens; the petals, from one to eight in number, are small, clawed and two-horned at the apex; the stamens are indefinite in number, and constitute the most conspicuous part of the flower when fully expanded; the pistil is usually single, but sometimes there are two or three. The pods are oblong, dehiscent and many-seeded.

The thick, knotty rhizome, with its numerous rootlets, constitutes the official drug. The rhizomes have a horizontal growth and often attain a length of four or five inches, and the rhizome proper may attain an inch or more in thickness. On its upper surface are numerous stout, erect or somewhat curved branches which are terminated by cup-shaped scars, each of which usually show a distinct radial structure. The sides of the rhizome are more or less distinctly annulate with the scars of scales, and from the sides and lower surface, chiefly from the nodes, issue numerous rootlets. These, at their base, range from one-twelfth to as much as one-fourth of an inch in diameter and from six to ten inches long. In

the dried form, as the drug occurs in the market, the roots are much broken, the rhizomes are blackish-brown, hard and break with a smooth or a somewhat fibrous fracture. The color internally is

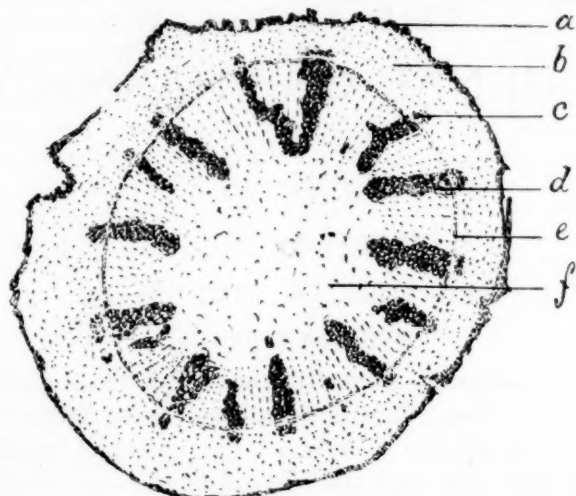


FIG. 1.

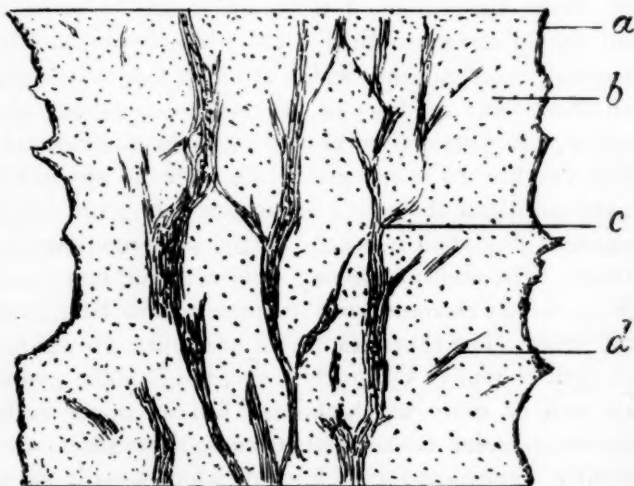


FIG. 2.

much lighter, being brownish or whitish. The roots are longitudinally wrinkled, brittle, and in cross-section appear obtusely triangular, pentangular or most commonly quadrangular, the number of angles depending upon the number of rays in the medullium.

The drug in the dried form has a slight but heavy odor, and a bitter and acrid taste.

The cross-section of the rhizome or of its branches, when stained by aid of phloroglucin and hydrochloric acid to reveal distinctly the wood wedges, shows that the latter are rather short, irregular in size and placed at unequal distances apart around a large central

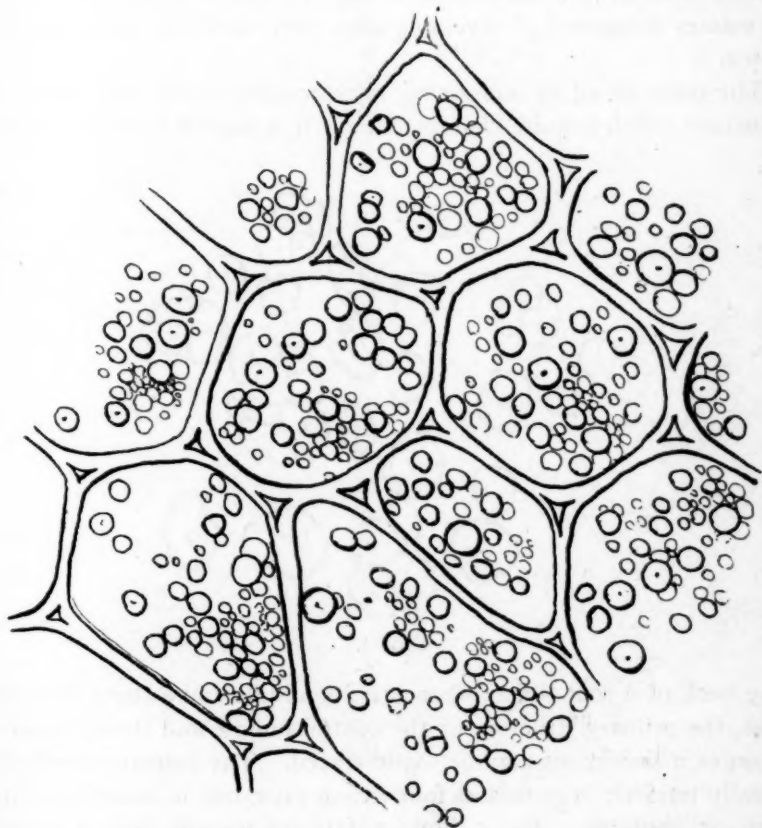


FIG. 3.

pith. The vascular bundles are usually considerably narrower than the medullary rays which separate them, and the bark is rather thick. These facts are shown in *Fig. 1*.

A longitudinal section stained in the same way shows the bundles to be also irregular in their course, and that adjacent bundles frequently send out anastomosing branches, as indicated in *Fig. 2*.

The parenchyma both of the rhizome and roots contain, if the drug is gathered in autumn, as should be the case, a considerable quantity of rather fine-grained starch, as shown in *Figs. 3 and 4*. The starch grains are more commonly simple and rounded, or somewhat angular, with a central or subcentral not usually conspicuous hilum, and only rarely showing concentric markings. Many of the grains, however, are compound, in twos, threes, or occasionally even in masses composed of several grains, very rarely as many as nine or ten.

The roots afford an interesting microscopical study and reveal a structure which is quite characteristic. If a section be made a little



FIG. 4.

way back of a root-tip, another near its middle and a third near its base, the primary structure of the central bundle and the secondary changes it undergoes may be easily traced. The primary bundle is usually tetrarch or possesses four xylem rays, but is sometimes triarch or pentarch. *Fig. 5* shows a tetrarch bundle from a young portion of a root in which the bundle is but little altered by secondary changes. A wavy zone of cambium has only just been formed between the phloem masses and over the ends of the xylem rays.

In *Fig. 6* the secondary changes have progressed much farther, the whole bundle is much increased in size by growth in the endodermis, in the pericambium and particularly in the cambium zone. The inner ends of the xylem rays have grown by the formation of

new ducts until the bases of some of the adjacent rays appear to coalesce. The phloem masses have also increased considerably in size by new growths on their inner face. Finally, in *Fig. 7*, a section of the old or mature portion of the bundle is shown. In this the bundle is observed to be enormously increased in size, and most conspicuous among the structural changes observed are the forma-

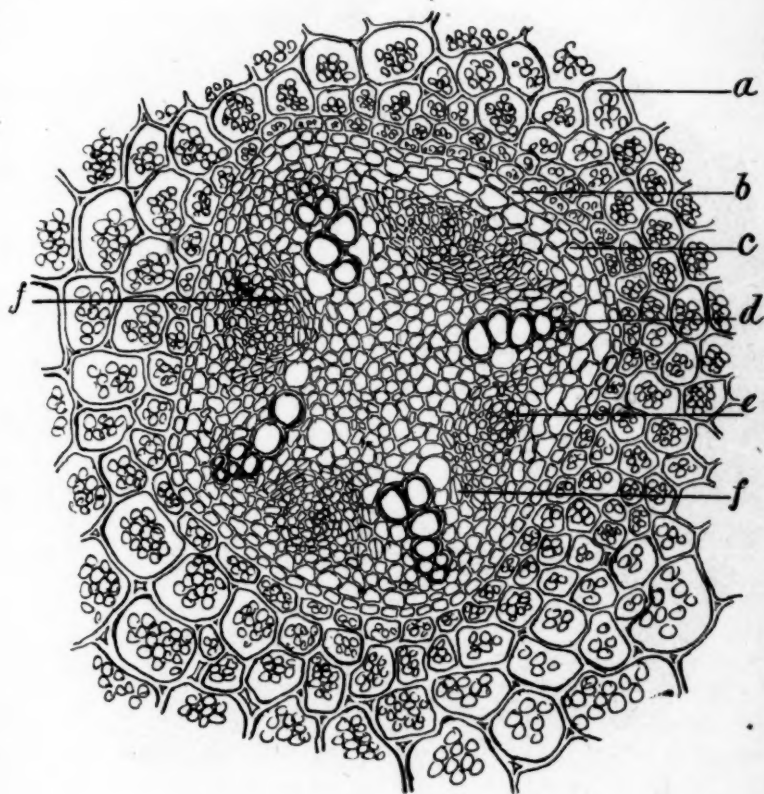


FIG. 5.

tion between each pair of primary xylem rays and back of each phloem mass a large xylem wedge, so that the xylem elements in their arrangement now present the form of a Maltese cross. Alternating with the arms of this cross are four broadly-wedge-shaped medullary rays (also secondary formations), the thin inner end of each wedge resting upon one of the original xylem rays, as shown at *f* in the figure.

In this species it will be seen that the number of secondary xylem wedges and of medullary rays corresponds to the number of xylem rays and of phloem masses in the primary radial bundle.

The root thus affords us the best characters for the identification of the drug. There are few roots in which the most characteristic

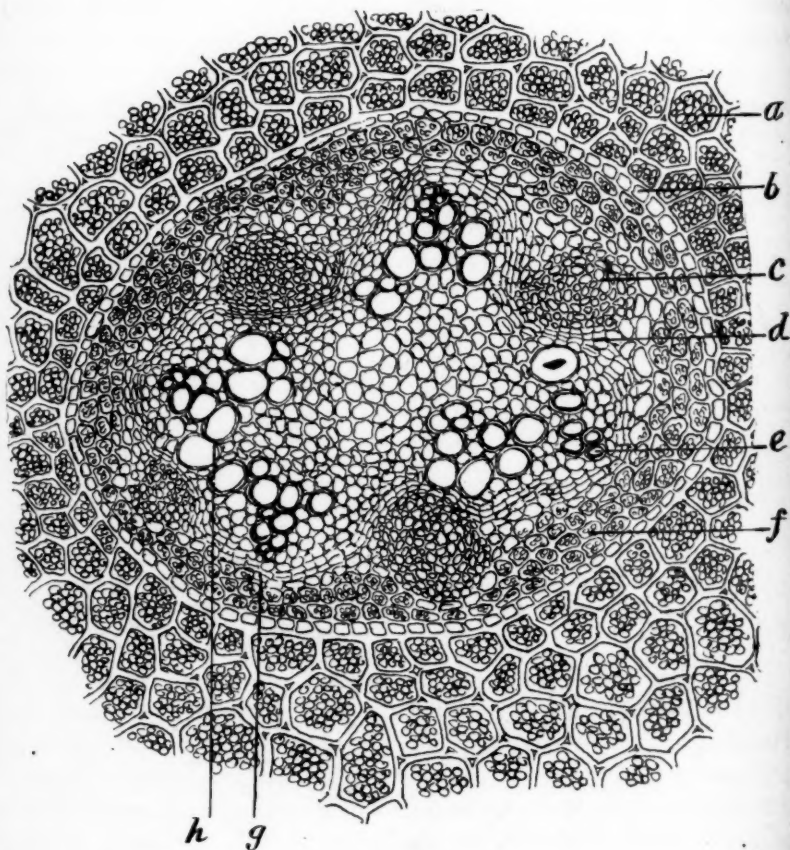


FIG. 6.

secondary changes that occur in the roots of dicotyls are traceable with so little difficulty as in this. It therefore affords an especially good example for the young microscopist to study.

It should be observed also that the number of rays is not always constant in the same root. It may, for example, be triarch at the apex and tetrarch near its base, or it may be tetrarch near its apex

and pentarch toward its base. In this respect, however, the roots of *cimicifuga* are not exceptional, many other dicotyls as well as many monocotyls showing similar variations in the number of rays.

DESCRIPTION OF FIGURES.

Fig. 1.—Diagram of cross-section of a small rhizome of *Cimicifuga*, magnified 6 diameters. *a*, cork; *b*, middle bark; *c*, phloem mass or bast; *d*, xylem of a bundle; *e*, cambium zone; *f*, pith.

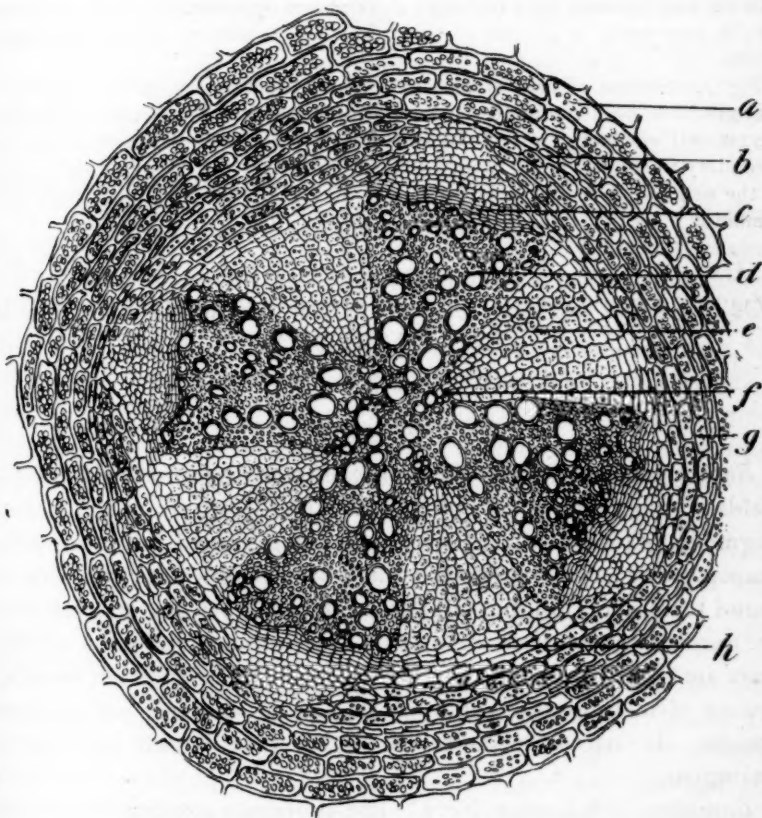


FIG. 7.

Fig. 2.—Diagram of a longitudinal tangential section of same rhizome, also magnified 6 diameters, showing anastomosing bundles. *a*, cork; *b*, middle bark; *c*, xylem of a bundle; *d*, small portion of bundle passing out to supply rootlet.

Fig. 3.—Small portion of cortical parenchyma, showing starch grains. Magnification, 495 diameters.

Fig. 4.—Starch of *Cimicifuga*. Magnified 1000 diameters.

Fig. 5.—Drawing showing tetrarch radial bundle of root of *Cimicifuga*, magnified 110 diameters. The section was from a young root, in which the medullium had undergone but little secondary change. *a*, a parenchyma cell from cortex; *b*, cell of endodermis. *c*, pericambium; *d*, outer end of xylem ray; *e*, phloem; *f, f*, meristem forming between xylem ray and phloem.

Fig. 6.—Section showing central part of an older root in which the secondary changes have made further progress. Magnification, 110 diameters. *a*, parenchyma cell of cortex; *b*, cell of endodermis; *c*, phloem; *d*, meristem now traceable as a cambium zone; *e*, outer extremity of xylem ray; *f*, starch-bearing cells formed beneath pericambium; *g*, cambium opposite outer end of xylem ray; *h*, new ducts in process of formation, the beginning of the secondary xylem.

Fig. 7.—Section of central part of a mature root in which the secondary changes have been completed. Magnification, about 60 diameters. *a*, parenchyma cell of cortex; *b*, cell of endodermis; *c*, cambium zone; *d*, duct in secondary xylem; *e*, broad, wedge-shaped, medullary ray; *f*, outer end of one of the original xylem rays at inner end of medullary ray; *h*, inter-fascicular cambium. *Figs. 5, 6 and 7* are from the author's Laboratory Exercises.

NOTES ON SOME SAPS AND SECRETIONS USED IN PHARMACY.

BY P. L. SIMMONDS, F.L.S.

[Continued from p. 100.]

Butea frondosa, Roxb. This Indian tree—the Dhak or Pulas—yields a gum which is sold as Bengal kino. It occurs in the form of fragmentary pieces of a deep claret color, mixed with similarly-shaped particles of gray bark. The purer qualities are met with in round tears, often bright claret colored and free from dirt. It may be purified by solution in water. The brilliant ruby-red colored tears are translucent and very brittle, heat rendering them more so, instead of melting the gum. With age, it darkens, and becomes opaque. In native medicine, in India, it is largely used as an astringent.

Camphora officinarum, Nees. The aggregate exports of camphor from China have increased considerably of late years. They were 22,231 cwt. in 1892, and 40,763 cwt. in 1893. The island of Formosa yields the principal quantities, the yearly output being now as much as 41,650 cwt., shipped from the ports of Tamsui and Tainan. The exports from Japan range from 3,000,000 to 4,500,000 cattsen, = 35,714 cwt. to 53,571 cwt.

Malay or Borneo camphor is obtained from *Dryobalanops aromatica*. The imports of crude camphor into the United States seem on the decline, having been 2,857,222 lbs. in 1887, and but 1,733,425 lbs. in 1893.

Canarium commune, Lin. This tree yields the concrete resinous exudation, known as Manila Elemi. It has a fragrant, fennel-like odor, and is usually soft and unctuous to the touch. Its medicinal properties are analogous to those of turpentine, and it is for external use only. It is said, however, to have the same properties as copaiva.

C. edula, of Africa, exudes a similar resin.

C. strictum, Roxb. The black dammar tree, yields a brilliant resin, which is used medicinally in India as a substitute for Burgundy pitch.

Carica papaya, Lin. This tree has several valuable medicinal properties. The milky juice is among the best vermifuges known. The natives in India repeatedly use it for children. In the West Indies the powder of the seeds is used for the same purpose. The juice of the fruit is said to destroy freckles on the skin, caused by the sun's heat, and the negroes employ the leaves to wash linen, instead of soap. The fruit is pickled and preserved for curries. The milky, viscid juice of the fruit has a singular effect in rendering meat tender. It has this effect even if the meat is hung under the tree for two or three hours.

Cedrus Dedara, Loudon. This tall, handsome Indian tree yields a true resin, and, by destructive distillation, a dark-colored oil, resembling tar, which is used medicinally.

Cistus Creticus, Lin.

Labdanum, or Ladanum, is a viscous, resinous exudation from the above species, and also to some extent from *C. ladaniferus*, L., *C. Ledon*, Lam., *C. laurifolius*, L., and *C. monspiliensis*, Lin. It is black brown, soft, of pleasant smell and bitter taste, and was once in high repute in medicine as a stimulant and expectorant, and recommended in chronic catarrh; but at present is chiefly used in perfumery. About 50 cwt. are annually collected in Crete, and some quantity also in Cyprus, and sent to Constantinople. Labdanum was formerly regarded by the Turks as a preventive against the plague, and they wore pieces as amulets, or affixed to their walking-sticks. They chiefly use it now for fumigation.

Cochlospermum Gossypium, DeC. This tree and *Sterculia urens* yield a clear white gum, which can be employed as a substitute for tragacanth, and is exported to America. It is issued to the Government hospitals in Bombay instead of tragacanth, and is largely used in that city in the manufacture of sweetmeats.

Commia Cochinchinensis, Lour. This tree yields a white tenacious gum, of an emetic, purgative, deobstruent nature. If prudently administered, it is useful in obstinate dropsy and obstructions.

Copaifera Lansdorffii, Desf. This and some other species (*C. officinalis*, Lin., *C. Martii*, Hayne, *C. Guianensis*, Desf., and *C. coriacea*, Mart.) are believed to yield the medicinal oleo-resin. It is obtained chiefly from the Amazon district, by making incisions in the tree, and the sap flows so abundantly that as much as 12 pounds weight is collected in a few hours, and 42 quarts during the season. The source of copaiba is usually given as *C. multijuga*, but this is very questionable. In its medicinal action, copaiba is of great value as a diuretic and stimulant remedy in certain affections of the bladder and urethra; also in chronic bronchitis and other affections of the lungs and air passages, attended with excessive secretion. It has likewise been found serviceable in some chronic skin diseases, as leprosy and psoriasis. The imports into London are included with other balsams, therefore the quantity cannot be given. The imports into the United States, however, were, in 1888, 132,262 pounds; in 1889, 163,624 pounds, and in 1890, 206,240 pounds.

Dichopsis Gutta, Benthams; *Isonandra Percha*, Hooker; *Isonandra Gutta*, Lind.; *Palaquium Gutta*, Baillon and Burck. Gutta-percha, although chiefly employed for various economic purposes, has also a few medicinal and surgical applications. Sheets softened in water, when applied to injured limbs, harden and form good splints; dissolved in chloroform, it is applied as a dressing for wounds, and various surgical instruments are made of it. The imports into Great Britain in 1890 were 70,162 cwt., of the value of nearly £800,000, and in 1893, 40,497 cwt., valued at £303,593.

Dipterocarpus laevis, Ham.

The WOOD OIL known in all the Indian bazaars as "Gurgun," is obtained by tapping certain trees of this order, and applying heat to the incision. Several species yield the oil, which has all the medical properties of some of the more esteemed balsams, especially as a substitute for capaiva, in gonorrhœa and certain skin diseases.

D. incanus, Roxb., is reported to furnish the largest proportions of the best sort. The following is Roxburgh's account of the manner of obtaining this oil from *D. turbinatus*, Gaert.: "This tree is famous over all the eastern parts of India and the Malay Islands, on account of its yielding a thin, liquid balsam, commonly called 'wood oil,' which is much used in painting ships, houses, etc. To procure the balsam, a large notch is cut into the trunk of the tree, near the earth, and, say, about 30 inches from the ground, where a fire is kept up, until the wood is charred, soon after which the liquid begins to ooze out. A gutter is cut in the wood to conduct the liquid into a vessel placed to receive it. The average product of the best trees during the season is said to be sometimes 40 gallons. It is found necessary, every three or four weeks, to cut off the old charred surfaces, and burn them afresh; in large, healthy trees abounding in balsam, they even cut a second notch in some other part of the tree, and char it as the first. These operations are performed from November to February. Should any of the trees appear sickly the following season, one or more year's respite is given them."

This oleo-resin has been used in the cure of leprosy. Large quantities are exported from Burma to Europe, as it has become an important drug in trade. From the port of Hankow, in China, in 1893, 403,200 cwt. of this oil was exported.

Dorema ammoniacum, Don.

Diserneston gummiferum, Sp. and Jaub.

Peucedanum ammoniacum, Nees.

This fetid gum resin, having properties similar to asafœtida, comes in mass and in tears from Persia.

Lump ammoniacum resembles galbanum, while that in tears is somewhat like olibanum, but has a smooth surface outside, and an opaque fracture. It is used in medicine as an antispasmodic, stimulant and expectorant, in chronic catarrh, bronchial affections and asthma, and also for some plasters.

The imports into London are not large, and average about 100 packages, but fluctuate; in 1891, only 46 packages were received, but in 1892, 279 cases of $1\frac{1}{2}$ cwt. each, and in 1893, 45 cases.

It is called "Uschekh" in Persia; in that country it is much used as an inward medicament, and also frequently for greasing the spinning wheels, as it is very cheap.

Dracæna species. The dragon's blood of Africa has been known in medicine from the earliest historical times. About 200 chests in mass or blocks come into London yearly. It is the resinous exudation of several different plants, is dark red-brown, and, when pulverized, carmine red, without taste or smell.

The African from Somali land is yielded by *D. Schizantha*, and that of Socotra by *D. Ombet*. The resin exudes, after the bark has been scraped, in about a fortnight. The Socotra kind is exported from Aden to Bombay.

Dragon's blood was formerly referred to *Dracæna Draco*, Lin., and *Calamus Draco*, Lin. The Sumatra dragon's blood appears in commerce in the form of reeds or sticks about a foot long wrapped in palm leaves. It is, sometimes, employed in the composition of tooth-powders, but seldom now in medicine. *Pterocarpus Draco* also yields dragon's blood, and other species kino.

Eperua falcata, Aubl., *Dimorpha falcata*, Swartz. The Wallaba resin obtained from this tree in Guiana is inflammable and gives a bright light.

Its styptic and curative powers in cuts and bruises are well appreciated by the Indians and other natives of the Colony. An oil obtained from the wood is also used as a dressing for incised wounds.

Eucalyptus rostrata, Schlechtendal. An exudation from this tree is a most invaluable medicine in certain disorders. It exudes in a fluid state from the bark, and in some instances between the different layers of the wood, and by the evaporation of the watery particles by which it is held in solution, it concretes into a beautiful ruby-colored gum, which, when exposed for a length of time to the air and sun, assumes a black color from an imperfect oxidation, losing at the same time its astringency. This gum is an original astringent principle, analogous in some respects to tannin, the basis of other vegetable astringents, but by no means identical with that compound.

It is more effective than catechu, or Indian kinos, although it contains a less amount of astringent matter.

Dr. J. Sutherland, of Bathurst, Australia, in a communication to my *Technologist* (vol. 3, p. 69), thus speaks of it:

"As a medicine, it is a more powerful astringent than any in our Pharmacopœias, and justly merits a place among the legitimate arti-

cles of the *Materia Medica*. I have prescribed it in a variety of disorders in which astringents are indicated, and found it peculiarly serviceable in certain stages of diarrhœa and dysentery, in passive hæmorrhage, as an injection in leucorrhœa, gonorrhœa and gleet, in scurvy of the gums; as a gargle when the acute symptoms have subsided, in relaxation of the uvula, in hæmorrhoids; in the form of an ointment made by dissolving a drachm of the gum in a teaspoonful of water, and, when intimately mixed, rubbing it up with an ounce of lard. The dose for internal administration varies from one or two grains to twenty, dissolved in water."

Euphorbia officinarum, Lin., or *E. resinifera*, Berg. The above, *E. canariensis*, Lin., and some other fleshy species, produce the saline, waxy resin, called in the shops "Gum Euphorbium," which is the inspissated, milky juice of these plants. It is chiefly obtained in the neighborhood of Mogadore and called "Dergmuce." It is used as a vesicant in veterinary medicine, but is seldom employed otherwise. The inhabitants of the lower regions of the Atlas Range make incisions in the branches of the plant, and, from these, the milky sap exudes, which is so acrid that it excoriates the fingers when applied to them. This exuded juice hardens by the heat of the sun, and forms a whitish-yellow solid, which drops off in the month of September and forms the Euphorbium of commerce. It causes considerable irritation of the nostrils and eyes when powdered. *E. Antiquorum*, Lin., yields a hydrocarbon, gutta-percha-like substance, known as "Cattimandoo," which* is the *Dorf* of the Hindus—a much-prized medicine.

Feronium elephantum, Corr.; *Cratæva Valanga*, Kon. This tree yields a brownish or reddish gum with a small proportion of clear, yellow tears, soluble in water. The Pharmacopœia of India pronounces it as superior to gum arabic for medicinal purposes.

Ficus elastica, Roxburgh; *Urostigma elasticum*, Miqu. To give some idea of the vastly increasing extent to which rubber, obtained from various elastic saps, is now required, it may be stated that the British imports of caoutchouc, in 1893, were 293,373 cwt., and the United States import even more. The combined imports of India-rubber and gutta-percha into the United Kingdom in 1893, were about 324,000 cwt. Great Britain also imports about 3,250,000 pounds of rubber manufactures. At Wedzell's factories, in Munden and Hildesheim alone, there were produced, a few years ago, over 100,000 pounds of surgical articles from it.

Fraxinus ornus, Lin.; *F. rotundifolia*, Lam.; *Ornus Europæa*, Pers.; or *Ornus rotundifolia*. The sweet exudation, known as "Manna," is chiefly the concrete juice obtained by incising the bark of the ash and collecting it on pieces of stick, hence, called flaky manna. The best is in oblong, light, friable pieces, of a whitish color and somewhat transparent, with a sweetish, sharp taste and a weak smell. The inferior kinds are moist, unctuous and dark-colored. It is a mild aperient medicine. Each hectare (of two and one-half acres) planted with the ash—4,000 to 5,000 trees—produces on an average nearly 2,000 pounds of manna. It used to be produced in Calabria, but that exported comes chiefly now from Palermo, in tin boxes weighing about 14 pounds. Small flake-manna is sent out in cases of about 120 pounds, large flake-manna, in cases of half that size. The export of manna from Italy, in 1884, was about 446,000 pounds. Spurious manna is known by its uniform color and freedom from the slight impurities, as well as from the peculiar odor and slight bitterness of true manna.

Calabria was, many years ago, the only source of the manna of commerce, but the production there has ceased, and, as stated above, Sicily is now the chief seat of production. Manna is nutritious, particularly when recent. It is a mild laxative, does not excite inflammation, useful for children and delicate females, usually operating mildly, but in some cases produces flatulence and pain.

In certain cases, the leaves of *Larix Europæa* exude a species of manna called "Manna of Briancon," which is eaten in Russia. Another kind is from *Tamarix mannifera*, and the Oriental manna of the desert from *Alhagi maurorum*, DeC., *A. mannifera*, Desl. The sugary secretion obtained naturally from this plant is chiefly collected in Khorasan, Kurdistan and Hamadan, and imported into Bombay. As a medicine its effects correspond to those of the ash manna.

The Arabs who cross the deserts avail themselves of the manna of the camel's thorn (*Alhagi camelorum*, Fisch.). It is found in the morning on the ground round the plant, during several days of the summer, and is collected before the sun can melt it. It occurs in small, round, unequal grains, the size of coriander seed, of a yellowish white or greenish yellow color, caking together and forming an opaque mass, in which are found portions of the thorns and points of the plant. This manna is inodorous, its flavor is sweetly saccha-

rine, followed by slight acidity. The Khergesse use it for various kinds of sweetmeats. The inhabitants collect these exudations and make them into loaves or cakes. These soon become of a black color, owing to a kind of fermentation, produced by the air and moisture. The flavor of these manna loaves resembles that of senna in taste; they also resemble senna combined with sweetness. These two characters lead one to suppose that this manna is more purgative than nutritive. Some authors, as Hallé and Guillamin, state that this constituted the manna of the Hebrews, but it is more generally supposed that the *Lecanora affinis*, Eversm, was the substance upon which the Israelites fed in the wilderness.

Some kinds of manna are obtained in Kurdistan from the dwarf oak, tamarisk, and other trees, but are seldom met with in commerce, being used up locally.

A kind of manna is found in small quantities on the branches of the cedar of Lebanon, in the form of transparent, resinous drops, indubitably the result of the puncture of an insect, like the *lerp* of Australia. The monks collect this manna and prepare with it various electuaries and ointments, which are sold to strangers visiting the monasteries. This cedar manna enjoys a considerable reputation in Syria as a remedy in phthisis.

The imports of manna into the United States were as follows: in 1888, 31,703 pounds; in 1889, 25,246 pounds; and in 1890, 43,509 pounds.

(To be continued.)

VOLATILE OIL FROM CANADA BALSAM.

BY HERMAN L. EMMERICH.

CONTRIBUTION III.

The oil of Canada balsam (*Abies balsamea*, Miller) has been examined by several students of this laboratory during the past few years.¹ The material with which Mr. Kressin worked, in the spring of 1892, has been standing untouched for the past two years. Upon the examination of the bottles containing the fractions mentioned by him, a number of observations were made which invited further examination.

¹ I, was published by Mr. Kressin. Proc. Wisconsin Phar. Assoc. 1892, 66.

II, Carl G. Hunkel, AM. JOUR. PHAR. 87, 9.

FRACTION I.

The bottle containing this fraction was filled completely and well stoppered. The oil possessed a pale straw color and a terebinthinate odor. Its relative density was found to be 0.900 at 20° C. In a 100 mm. tube, it deviated the ray of polarized light 24.83° to the left; hence, (a) D equals — 27.59°.

Since Mr. Kressin had not determined any other constant than the boiling point of this fraction, no comparisons could be made. Mr. Kressin's note (page 67) refers to Fraction II, not Fraction I, of Mr. Kradwell. However, one will certainly not go far amiss to suppose that the (a) D for this fraction was about — 34° (compare table p. 67).

Upon analysis this fraction yielded the following results:

- I. 0.2034 gms. of substance yielded 0.1914 H₂O = 0.02125 H.
and 0.6191 CO₂ = 0.1688 C.
II. 0.2182 gms. of substance yielded 0.2324 H₂O = 0.0258 H.
and 0.6638 CO₂ = 0.18103 C.

Calculated for C₁₀H₁₆.

Per Cent.	Found.	
	I.	II.
C. 88.23	83.01	82.96
H. 11.76	10.45	11.83

Although the boiling-point of this fraction, as well as its odor, indicated the presence of pinene, the amount of oxygen present, 6.5 per cent., clearly indicated that it was by no means pure.

That pinene is present in the oil has been clearly demonstrated. That it is present also in this fraction was shown by means of its nitroso chloride, 6.54, 10.17 and 11.25 per cent., respectively, being obtained in three different experiments. That the yield should be much greater in these experiments than in those made by Mr. Kradwell and Mr. Kressin, is now easily understood, if one takes into consideration the results of E. W. Smith on the yield of nitroso chloride of pinene from oils of different rotatory power.¹ The decrease in the rotatory power of this fraction, after two years, standing, is sufficient explanation for the increased yield of nitroso chloride. The melting point of the nitroso chloride, after purification, was found to be rather high, viz.: 107° C. However, the nitrol-benzyl-amine base closely resembled the nitrol-benzyl-amine pinene. It melted at 122° C.

¹ Proc. Wisconsin Phar. Assoc., 1891.

Since the bottle in which this fraction was contained was completely filled and well stoppered, it did not appear very probable that a large amount of oxygen should be due to the presence of pinol-hydrate, or any other oxidation product of pinene that might result upon standing.

To ascertain whether it was present in the form of an ester, 25 c.c. of this fraction were boiled with .62 c.c. of a 6.68 per cent. alcoholic solution of potassa for four hours. Upon titration with decinormal sulphuric acid, V.S., it was ascertained that 0.6978 gms. of potassa had been consumed in the experiment, corresponding to 2.442 gms., or 10.85 per cent. of bornyl or terpinyl acetate. Upon distillation with water, a camphoraceous odor was very perceptible, but it was impossible to separate crystals. The experiment was repeated on a larger scale, 100 gms. of oil being used.

After saponification and distillation with water-vapor, 49 gms. of oil were obtained. A black, shining, pitchy residue was left in the distillation flask. The oil was colorless, and possessed a mixed terebinthinate and camphoraceous odor. After drying with anhydrous copper sulphate, its relative density was found to be 0.864 at 20° C. In a 100 mm. tube, it deviated the plane of polarized light 30.18° to the left, hence (*a*) *D* equals — 34.93°. Upon fractionation, the following fractions were obtained:

Boiling Point.	Percentage.	Relative Density at 20° C.	(<i>a</i>) <i>D</i> .
— 155°			
155° — 161°	about 25.00	0.8657	— 34.267°
161° — 164°	about 24.00	0.8728	— 34.254°
164° — 167°	about 23.6	0.8743	— 34.34°
167° — 170°			
170°			

Upon exposure to cold for several days, no crystals separated. Fraction 170° was further fractionated, and fractions 170 — 180° and 180° + were obtained; fraction 180° + was exposed to a freezing mixture. Crystals resembling borneol were obtained, but the yield was too small to allow isolation.

FRACTION III.

The bottle containing this fraction was almost filled and well stoppered. The oil possessed a pale straw color and a terebinthinate odor, very much like Fraction I. Its relative density was found to be 0.903 at 20° C. In a 100 mm. tube it deviated the

plane of polarized light 25.4° to the left, hence (a) D equals — 28.128° .

Mr. Kressin had determined the physical constants of this fraction. On comparison, it will be seen that the relative density had increased 0.045, and that its optical activity had decreased 6.61° .

Upon analysis this fraction yielded the following results:

- I. 0.2031 gms. of substance yielded 0.6236 CO_2 = 0.1681 C.
and 0.2081 H_2O = 0.023 H.
II. 0.1776 gms. of substance yielded 0.5459 CO_2 = 0.1488 C.
and 0.1854 H_2O = 0.0206 H.

Calculated for $\text{C}_{10}\text{H}_{16}$.

Per Cent.
C. 88.23
H. 11.76

Found.	
I.	II.
Per Cent.	Per Cent.
83.739	83.829
11.423	11.599

That pinene was present also in this fraction was proved by means of its nitroso-chloride 7.136 — 7.7 — 6.39 per cent., respectively, being obtained in three different experiments. The melting-point of the nitroso-chloride proved to be 102° – 103° C. To further establish the presence of pinene, the benzyl-amine base was prepared, which closely resembles pinene-nitrol-benzylamine. Its melting-point proved to be 122° C.

FRACTION VIII.

The bottle containing this fraction was about one-quarter filled and well stoppered. The sides were covered with small acicular crystals, presumably pinol-hydrate. The oil was filtered and dehydrated by means of anhydrous sodium sulphate. The oil was of a slightly yellowish tinge, almost colorless, and possessed a terebinthinate odor, though less marked than the lower fractions. Its relative density at 20° C. was found to be 0.8805. In a 100 mm. tube it deviated the plane of polarized light 30.187° to the left, hence (a) D equals — 34.304° .

Compared with Mr. Kressin's constants we found the relative density had increased 0.211 and its optical activity had decreased 5.893° .

Upon analysis this fraction yielded the following results:

- I. 0.231 gms. of substance yielded 0.7138 CO_2 = 0.1947 C.
and 0.2466 H_2O = 0.0274 H.
II. 0.258 gms. of substance yielded 0.8036 CO_2 = 0.21916 C.
and 0.2932 H_2O = 0.03257 H.

Calculated for $C_{10}H_{16}$.

Per Cent.

C. 88.23

H. 11.76

Found.

I.	II.
Per Cent.	Per Cent.
84.27	84.946
11.86	12.62

FRACTION IX.

The bottle containing this fraction was about one-quarter filled, well stoppered, and showed no crystals on its surface. The oil possessed a faint terebinthinate odor, and was almost colorless. It had separated into two strata.

The lower stratum was colorless, and possessed a terebinthinate odor. The relative density of the dehydrated oil at 20° C. was found to be 0.8483. In a 100 mm. tube it deviated the plane of polarized light 31.666° to the left, hence (a) D equals — 37.332°.

Upon analysis it yielded the following results:

- I. 0.1928 gms. of substance yielded 0.6048 CO_2 = 0.16493 C.
 and 0.2116 H_2O = 0.0235 H.
- II. 0.2736 gms. of substance yielded 0.864 CO_2 = 0.2356 C.
 and 0.2946 H_2O = 0.0323 H.

Calculated for $C_{10}H_{16}$.

Per Cent.

C. 88.23

H. 11.76

Found.

I.	II.
Per Cent.	Per Cent.
85.54	86.12
12.19	11.96

The upper stratum was barely colored, possessed a pleasant fragrance, reminding of lemon oil. After dehydration the relative density was found to be 0.8257 at 23° C. In a 100 mm. tube it deviated the plane of polarized light 13.637° to the left, hence its (a) D equals — 16.527 at 23° C.

Upon analysis it yielded the following results:

- I. 0.1758 gms. of substance yielded 0.3959 CO_2 = 0.10797 C.
 and 0.1996 H_2O = 0.02217 H.
- II. 0.1997 gms. of substance yielded 0.457 CO_2 = 0.124635 C.
 and 0.2274 H_2O = 0.02415 H.

Calculated for $C_{10}H_{16}O$.

Per Cent.

C. 78.947

H. 10.526

Found.

I.	II.
Per Cent.	Per Cent.
61.418	61.91
12.61	12.09

The quantity of this fraction was not sufficient to allow of further experimentation.

As will be seen from the quantity of oxygen in fractions I and 9 the composition of this oil is much more complex, than was supposed. The investigation will be continued.

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REFERENCES.

- (1) Gustave V. Kradwell, Proc. Wisc. Pharm. Ass., 1891, p. 37.
- (2) Louis H. Kressin, *ibidem*, 1892, p. 66.

A CHEAP SUBSTITUTE FOR THE SELENITE.

BY HANS M. WILDER.

A set of selenite plates (generally three) is an indispensable adjunct to the polarizing outfit, because of the beautiful display of colors caused by their use.

Having on a certain occasion mislaid my selenites, I looked about for a substitute, and bethought myself of trying what mica, which is stated to possess similar light-retarding power as selenite, might do. To my agreeable surprise mica (the common stove-door kind) proved to be fully equal to any ordinary selenite, the colors being quite as handsome. Mica possesses two advantages: It is much cheaper, a piece three inches square costing about two cents, while a selenite (the usual size of which is $\frac{5}{8}$ of an inch) costs from one dollar up, and mica can be cut with scissors and handled without much fear of breaking it. The best way to proceed is as follows:

Put a slide of any polarizing substance (starch for instance) on the stage of the microscope, having previously put the two nicols in their places, and slip a piece of mica under the slide. Some kind of color will be observed. If not satisfactory or especially handsome, give the mica a slight turn around its axis, and try in this way whether in any position a satisfactory color is obtained. When found, cut one end square so as to be parallel with the slide; by always slipping in the mica in the same way the same color display will be obtained, since the retarding power and consequently the color varies with the thickness. Quite a variety of beautiful color effects may be obtained by either using mica plates of varying thickness, or by merely using two or more layers of thin plates superimposed. The colors may be varied still more by altering the

relative positions of the superimposed plates; in fact, three plates of varying thickness will be all that are necessary to keep. As stated before, mica costs next to nothing; if, therefore, the first piece does not suit, throw it away and try another. Select the clearest pieces. The mica plates may be cut and mounted to suit. Personally, I prefer strips about $1\frac{1}{2}$ inches wide, and somewhat longer than the stage from front to back, so as to be easily slipped in under the slide, and as easily removed.

NOTES ON BEESWAX, PETROLATUM MOLLE AND ROCK CANDY SYRUP.

BY LYMAN F. KEBLER.

About a year ago¹ I presented some notes on the examination of beeswax. Since then I have examined a goodly number of samples of this article, and not until recently have spurious goods come into my hands. This section of the country appears to be especially favored with highly adulterated beeswax,² some containing as high as 80 per cent. of paraffin, some composed of black earthy matter moulded into cakes and cleverly coated with yellow wax, other samples containing chrome-yellow, mineral matter, rosin, etc. Probably some sections do not report the results of their examinations.

It has frequently been asserted that beeswax is weighted with mineral matter such as gypsum, kaolin, yellow ochre, heavy spar and various other adulterants. I had come to the conclusion that the days of such gross sophistications were past, but the examination of four samples recently convinced me that this opprobrious business had been awakened from the slumber room of time, if it has been asleep. These four samples were composed of rosin, chrome yellow, yellow ochre, hæmatite, mineral wax and a little beeswax. A fifth sample was composed of about equal parts of mineral wax and beeswax. The following table contains the analytical data of the adulterated beeswax. Number 1 is a beeswax of known purity for comparison:

¹ 1893, Am. J. Pharm., 65, 585.

² 1874, Am. J. Pharm., 46, 510; 1875, Proc. Am. Pharm. Assoc., 23, 232 and 499.

Serial Number	M. P. C°.	Sp. Gr. at 15° C.	Acid Number.	Ether Number.	Total.	Ratio.	Adulterants.
1	63·8	0·964	19·60	75·60	95·20	3·857	{ Resin, paraffin, chrome yellow. Yellow ochre, earthy matter, paraffin. Earthy matter, paraffin, hæmatite. Mineral wax. Mineral wax.
2	48·0	0·925	25·13	48·30	73·43	1·122	
3	52·0	0·910	4·20	12·60	16·80	3·000	
4	55·0	0·925	4·61	16·10	20·71	3·492	
5	66·0	0·935	11·20	37·61	48·81	3·358	
6	74·0	0·921	10·50	19·60	30·10	1·866	

I have not added additional data, since they can be easily calculated from the above.

These samples of beeswax are curiosities, and if the specimens alone existed, it would be well and good, but that they represent hundreds of pounds in this market is a deplorable fact.

PETROLATUM MOLLE.

The U. S. P. requires this product to be ointment-like in consistence, odorless, tasteless, with a melting point varying from 40° to 45° C., and a specific gravity ranging from 0·820 to 0·840, at 60° C. It should be completely volatilized when heated on a piece of platinum without emitting any acrid vapors, and be free from resin and saponifiable fats and oils. When one volume of petrolatum is treated with two volumes of concentrated sulphuric acid in a test-tube placed in hot water and agitated occasionally during fifteen minutes, the acid should neither acquire a deeper tint than brown nor lose its transparency.

The following table contains the analytical results of nine samples of petrolatum molle :

Description.	M. P. C. °.	Sp. Gr. at 60° C.	Color of H ₂ SO ₄	Transparency of H ₂ SO ₄	Taste and Odor.	Saponifiable Matter.
Lily white . .	51	0·825	Brown	Semi-transparent	None	None
Snow white . .	50	0·829	Brownish	"	"	"
Snow white . .	40	0·823	Light Brown	Transparent	Decided	"
Cream white . .	54	0·834	Brown	Opaque .	None	"
Pearl white . .	49	0·831	Brown	"	"	"
Pearl white . .	47	0·827	{ Blackish }	"	Some	"
Pearl white . .	49	0·823	Brown	Semi-transparent	None	"
Pearl white . .	48	0·830	Brownish		Some	"
Light yellow . .	54	0·821	{ Blackish }		None	"
Light amber . .			Brown	"		

Each sample completely volatilized on platinum foil without any acrid vapors, was ointment-like in consistence, neutral and soluble in its various solvents.

Two French chemists have recently made numerous comparative tests with petrolatum, and came to the conclusion that this article was highly adulterated with fatty substances of both animal and vegetable origin. For easily detecting this sophistication 5 drops of a saturated solution of potassium permanganate are added to 5 grams of petrolatum, in a glass or porcelain mortar and triturated. If the petrolatum is pure the rose-red color is persistent; if saponifiable fats or oils are present the color becomes chestnut-brown. The intensity of the color is directly proportional to the percentage of admixture.

I applied the permanganate test to each of the above samples, but no chestnut-brown was obtained in any case.

ROCK CANDY SYRUP.

"Rock Candy Syrup" is generally considered to be the evaporated mother-liquor obtained in the process of manufacturing "Rock Candy." This product necessarily contains more or less reducing sugar. We must remember, however, that this article is also prepared by dissolving granulated sugar itself in a specified quantity of water, sometimes using an antiseptic. A certain manufacturer informed me that he used one ounce of salicylic acid for every 500 gallons of syrup. I was unable to detect it, however, even after having been informed concerning its employment.

This commodity has largely come into use in this country within recent years. Being differently prepared by various producers it necessarily varies in composition. In view of these facts it behooves us to examine carefully every sample before employing it for any use.

Some workers have expressed themselves quite adversely concerning this product, calling it worthless and not deserving a place in the drug market. Certain examiners while in quest of a pure rock candy syrup called the work "monotonous" since the danger signal flashed in every case, even with rock candy itself. While I realize that he who shuts his eyes to the adulteration of drugs is not the pharmacists' friend, yet I contend that it is not just to condemn all rock candy syrups because a few are spurious.

I have examined a fair number of samples and find the percentage of good rock candy syrup as high as that of other goods handled by druggists. Below you will find a table recording the results of a

number of samples examined during the past year. Some were excellent products, products that no pharmacist need reluctantly place on his shelf as rock candy syrup. A few were extremely bad.

Serial Number.	Sp. Gr. at 15° C.	Reducing Sugar.	Reaction.	Inorganic Compounds.
1	1.324	Trace per cent.	Neutral.	None.
2	1.315	Trace per cent.	Slightly acid.	None.
3	1.346	57.50 per cent.	Acid.	Sulphates.
4	1.330	Trace.	Slightly acid.	None.
5	1.322	6.5 per cent.	Slightly acid.	None.
6	1.330	17.85 per cent.	Neutral.	Sulphates & Chlorides.
7	1.330	20.00	Neutral.	Sulphates & Chlorides.
8	1.325	Trace.	Neutral.	None.
9	1.327	Trace	Slightly acid.	None.
10 ¹	1.321	36.13 per cent.	Slightly acid.	None.
11	1.322	5.00	Slightly acid.	None.
12	1.340	7.00 per cent.	Slightly acid.	None.

¹ Highly flavored with vanilla.

My standard for "Rock Candy Syrup" is; sp. gr. about 1.320 at 15° C., from a trace of reducing sugar to two per cent., neutral or slightly acid in reaction.

You will notice that every sample contains some reducing sugar. Simple syrup on standing a short time is said to deteriorate, forming reducing sugar. Some say simple syrup on being boiled is slowly converted into reducing sugar, but my experiments do not support this latter assertion.

A carefully prepared syrup, sp. gr. 1.330, free from glucose, was boiled vigorously for 1½ hours, the evaporated water carefully replenished from time to time. A drop of the syrup was tested every fifteen minutes for reducing sugar, but not a trace was detected in even the last test.

IMPROVEMENT IN THE MANUFACTURE OF ACETONE.¹

By E. R. SQUIBB, M.D., Brooklyn, N. Y.

The increasing use of acetone as a chemical solvent, and especially the relation of acetone to the manufacture of chloroform, gives importance to any improvement in its production.

Up to this time the writer knows of no process of manufacture except by the destructive distillation of acetates at high temperature. The acetates are charged into stills and heated as long as they yield any acetone. Then the acetates being decomposed to waste carbonates are discharged and the stills

¹ *Ephemeris*, Vol. 4, No. 3.

recharged with fresh acetate, making an interrupted process of repeated charging and discharging and heating and cooling. This process is very old; but two patents have been taken out in this country on some details of the process and apparatus.

The writer proposed to himself to make acetone directly from acetic acid by a continuous process, and has accomplished that object.

In Gmelin's *Hand Book of Chemistry*, Cavendish Society edition, 1853, Vol. VIII, at page 291, under the head of decomposition of acetic acid by heat, much work is given where the vapor of acetic acid was passed through heated tubes, acetone being one of the products; and, on this line of investigation, the writer's work was taken up.

It was not difficult to see that the discrepant results reached by the authorities were due to differing physical conditions, and different degrees of heating, since it was mechanically quite certain that a current of vapor passing through a stationary tube, heated from below, whether empty or filled, could not be heated to the same degree in all parts of the tube, and therefore could not give the same decomposition in all parts.

The work undertaken was commenced in very long-necked, glass bulbs, held in a horizontal position so that they might be stationary or be revolved by hand, and these were heated by a bath of Wood's metal—the acid being passed in, and the products coming out through horizontal tubes in the long necks.

Experiences with these bulbs led to much better mechanical devices. A small flask was arranged as a still, and from this, by a gas burner, a constant current of acetic acid vapor could be produced at any desired rate. The rate was regulated by the rate of supply of liquid acid from an elevated graduated supply vessel, the supply going to the still through a glass tube, in which the rate of dropping was seen and controlled by stop-cock. Then, by varying the acid supply and the heat from the burner, the boiling liquid in the still could be kept at about a constant level, and with a controllable known rate of vapor supply.

At some distance from this end of this apparatus the condensing apparatus was arranged to receive the distillates. The products of distillation were first received in a flask where most of the watery vapor and undecomposed acid was condensed, but where the temperature continued so high that but a mere trace of acetone was arrested there. From the neck of this flask the remaining gases and vapors passed through a good condenser which delivered the remainder of the water and undecomposed acid and the acetone into a flask immersed in an ice bath. Here almost all the condensible vapors were condensed. The gases and uncondensed vapors were taken from the neck of this flask to a small wash bottle supplied with water, by which the current of gases was washed. Here waste acetone enough was caught to increase the volume of contents to a point at which all went off together in the current of gases, and the level remained constant. Next was a wash bottle containing a strong solution of sodium hydrate. Through this the residual gases were passed in order that most of the carbon dioxide might be combined. Finally the gases were passed through another small wash bottle containing water. At the small exit tube of this bottle the gases were tested for inflammability, and the proportion of methane and carbon monoxide was estimated by the absence or the degree of inflammability. Except at the times of testing, this exit tube was

connected to a Sprengel water pump, and a minus pressure of 1 to 6 Cm. of mercury was maintained on the entire apparatus. This served to relieve all joints and connections and caused all the leakages to be inward, whilst a mercury gauge at each end gave due notice of obstruction or irregularities.

These two ends of the apparatus remaining constant, the intervening space was occupied by the varying form of distilling or decomposing apparatus. An earthenware drain pipe with movable tile ends served as a furnace. This drain pipe, supported in a horizontal position, had 6 holes drilled above and below. Each lower hole was large enough to admit a Bunsen burner with limited air space around it, while the holes on top, to give exit to the products of the combustion, were smaller. The decomposing tubes or stills of wrought iron, with cast-iron ends, occupied this drain pipe furnace, being connected with the vapor supply apparatus at one end and the condenser at the other.

Much preliminary work was necessary in getting the apparatus in good working order and in following up tangential points; but these are passed over, and only the important work given—and that not always in the order in which it was done, but in an order which brings the results into a more logical sequence more easily understood.

Two strengths of acetic acid were used. First, an acid containing 36 p. c. of absolute acid. But as this gave distillates unnecessarily dilute, it was generally given up in favor of a 60 p. c. acid, although the reactions were not noticeably different in the use of the two strengths. Hence, with two exceptions, the results given are from a 60 p. c. acetic acid.

Reducing the work from the disorderly way in which it was done to a natural order, and rejecting what was not trustworthy, it is best to begin with some repetitions of work already long on record. (See Gmelin's *Hand Book*, and other authorities.)

A tube of wrought iron about 36 Cm. (14 inches) in length by 6.5 Cm. (2.5 inches) internal diameter, reduced at each end to tubing of about 0.6 Cm. (.25 inch), was held stationary in the centre of the furnace, and connected at one end with the acid vapor supply, and at the other with the condensers. This tube could be heated by the gas burners to any desired degree up to a dull red heat. The trials were made under as nearly the same conditions as practicable, the running time being about 3.5 hours, and under close observation. The amount of 60 p. c. acetic acid which could be passed in in vapor during this time, varied much—generally 250 to 350 Cc. The quantities used were always reduced to absolute acid ($\text{HC}_2\text{H}_3\text{O}_2 = 59.86$), and the results are given in the same acid, but a high degree of accuracy was impracticable, and therefore not aimed at.

(1) With the tube empty and heated nearly to redness at first, and finally to dull red heat, 290 Cc. of 60 p. c. acid = 174 Gm. absolute acid, was passed in in 3.5 hours. About 111 Gm. of this acid passed through unchanged, and 63 Gm. was decomposed. That is, about 63.8 p. c. came through unchanged, and 36.2 p. c. was decomposed. In the first receiving flask, kept hot by the vapor, there was no acetone, but only 132 Cc. of a 53 p. c. acid. In the second flask, in the ice-bath, there was 115 Cc. of a 36 p. c. acid; and this liquid, roughly estimated by the iodoform test, contained 10 to 12 p. c. of acetone. From the final wash bottle came a stream of inflammable gas—probably methane and carbon monoxide—that would burn almost continuously.

(2) Next this stationary tube was filled with coarsely-granulated pumice-stone, freed from large pieces and from dust, and so tightly packed as to have spring enough to keep the tube full when expanded by heating. Into this, in 3.5 hours, 189 Gm. of absolute acid, in vapor, was passed, and yielded in the first, hot flask 103 Cc. of 54 p. c. acid = 55.62 Gm. absolute acid. In the second, ice-bath flask 138 Cc. of 38.4 p. c. acid = 52.97 Gm. of absolute acid, making 108.6 Gm. out of 189 Gm. distilled over unchanged, and 80.4 Gm. decomposed. The contents of this second flask were about 14.5 p. c. acetone. The stream of inflammable gases was estimated as being not less, but rather greater than with the empty tube.

(3) Next, took the pumice from the tube, divided it into two parts, and, rejecting one-half, intimately mixed with the other half 500 Gm. of dry precipitated barium carbonate. Charged the tube with this mixture, having a little unmixed pumice at both ends. Barium carbonate was selected to multiply surface, as being a rather heavy powder that would not shrink nor fuse, nor be likely to decompose.

About 450 Cc. of 60 p. c. acid = 270 Gm. of absolute acid was passed, in vapor, in 3.5 hours, into this mixture, heated as before. The distillate in the first hot flask was 81 Cc. of acid water of only 1.6 p. c. = 1.3 Gm. absolute acid. In the second ice-bath flask was 227 Cc. s. g., about 0.955, containing 1.2 p. c. acid = 2.7 Gm. absolute acid. Of the 270 Gm. passed in, 4 Gm. only distilled over unchanged, while 266 Gm. was decomposed. The 227 Cc. of distillate in the second flask contained about 23.3 p. c. of acetone. This proportion gives about 20 p. c. of acetone from the 266 Gm. of absolute acid used. The stream of inflammable gases was very much greater than in the other experiments, burning with an almost continuous large flame.

The desired splitting of acetic acid to yield acetone requires 2 molecules of the acid to yield 1 molecule of acetone, the residuary products being 1 molecule each of carbon dioxide and water. That is, 120 Gm. of absolute acetic acid should give

58 Gm. of acetone,
44 " " carbon dioxide,
18 " " water, or

by percentage the acid should give

48.33 p. c. acetone,
36.67 " carbon dioxide,
15.00 " water.

When marsh gas or methane (CH_4) and carbon monoxide (CO) are formed it is probably largely, if not entirely, through a secondary decomposition of the acetone by a higher heat than that which gives the primary decomposition into acetone, carbon dioxide and water, and when acetone and methane are produced together, it is rational to suppose that inequalities of heating are the cause. That is, if acetone be produced it indicates that the exact conditions required are present at that time and place. Then it follows that if these exact conditions be extended throughout the whole time and place of reaction, the acetone splitting of the acid only can occur, and no methane or other products of other reactions can be produced. The conditions for producing these different reactions are doubtless different degrees of heating, and uniformity of reac-

tion can be expected only from uniformity of heating. And the differences in the degrees of heat required to produce the different reactions here do not seem to be great.

The physical and mechanical conditions of heating a stationary tube cannot possibly yield an equal degree of heating to the contents of such tube, especially where only a part of such contents is in motion. Even if the whole outside of the tube could be equally heated—as it could not be practically—the contents would be cooler from circumference to centre. But in this case, where a current of vapor at about 100° C. is passed continually into a tube, the outside of which is kept unequally heated to 500 or 600° C., and where this current has to find its way at varying speed through varying friction and expansion, only a varying decomposition can be possible, and the conclusion must be that if uniform decomposition is to be reached it must be through uniform conditions.

Equable heating in a stationary tube, under the conditions of this process, being impracticable, it became necessary to devise some better form of still; and a careful consideration of the principles involved, and the especial mechanical difficulties of this decomposition, led the writer to a form of rotary still, which, after some alterations and modifications, has proved successful.

A wrought-iron tube about 36 Cm. (14 inches) long by 12.7 Cm. (5 inches) in diameter, contracted at the ends to central, hollow journals of about 2 Cm. (0.75 inch) external diameter and 1.2 Cm. (0.5 inch) bore, free to revolve, was supported in the centre of the 18 Cm. (7 inch) drain pipe furnace, and connected at one end with the vapor supply, and the other with the condensers by air-tight glands or "stuffing-boxes." The ends were provided with charging and discharging openings which could be closed air-tight, and the still was revolved slowly by means of a pulley on one end of the hollow shaft. A small stationary tube passed into the still through the revolving shaft to convey the acid vapor to the entrance of the still at one end, and a similar tube gave exit to the products of the decomposition at the other, condenser end. It was necessary to protect this tube from obstruction by dust carried by the current of vapors, and this was done by a cartridge of rolled-up, wire cloth filled with glass wool. This rotary still was driven at the rate of three to six revolutions per minute by a small water-motor, and was found to heat with great equability as it revolved over the burners. Inside of the still, at equal distances apart on the periphery, five L-shaped, longitudinal strips of sheet-iron were riveted. These were necessary to prevent the charge from sliding round as the iron became smooth, and they were found to carry the charge round, turn it over and mix it most effectively at each revolution. Thus, while by the revolutions over the source of heating the shell was heated very uniformly, this continuous moving and turning over of the contents must bring all parts of the charge, solids and vapors alike, in successive contact with the hot surfaces and the cooler atmosphere of the still, and thus secure a fair degree of equable heating. The still being about one-third filled with the solid charge and slowly rotated, the charge occupies principally, not the bottom of the still directly over the fire, but the ascending third which has just been over the fire. Then, as the charge is carried up, the superficial cooler portion, too deep to be held by the longitudinal shelves, slides back onto the hot surface below, while the portion carried on by the shelves falls back, shelf by shelf, from contact with the hot shell through

the atmosphere of vapor, onto the cooler portions below, to be mixed and carried up again in a similar order. At the same time the whole atmosphere of the still is filled with dust which becomes very fine, and very largely multiplies the surfaces of contact with the vapor for decomposition, whilst the vapors pass slowly and uniformly and with a minimum of friction to the exit at the condenser end. If the motion and heating of a charge in this still be compared with those in a stationary still with a horizontal stirrer driven by a vertical shaft, the advantages of the former will be easily understood. The latter moves the charge round over the fire, but has a comparatively slight effect in bringing new portions of the charge successively in contact with the heating surfaces, and it does not tend to prevent horizontal stratification of the charge with consequent irregular heating; and it does not tend to the fullest contact of the vapors with the surfaces of the charge, where the decomposition probably takes place. After the inevitable number of trials and adjustments and breakings down, the following successful experiments are selected from a large number:

(4) As a parallel experiment to (1) with the stationary still, the rotary still was used empty.

About 200 Cc. of 36 p. c. acid = 72 Gm. of absolute acid was slowly passed into the heated, rotating, empty still.

The first hot flask of distillate contained 33 Cc. of acid of 14.6 p. c. = 4.82 of 17.89 Gm. absolute acid.

The second ice-bath flask contained 142 Cc. of acid acetone, 12.6 p. c. Gm. absolute acid. Then $4.82 + 17.89 = 22.71$ Gm. absolute acid distilled over unchanged. Then $72 \text{ Gm.} - 22.71 = 49.29$ Gm. of acid decomposed. The second distillate gave an estimate of 12.1 Gm. acetone. Then as 49.29 acid : 12.1 acetone : 100 : 24.5 p. c. acetone from the acid. The current of inflammable gas was considerable, but less than in (1).

(5) The rotary still was charged with about a litre of the same granulated pumice used in (2), and when heated about 295 Cc. of 60 p. c. acid = 177 Gm. of absolute acid, was passed in in vapor during 3.5 hours.

The first distillate, hot flask, had 108 Cc. of acid water of 4.4 p. c. = 4.75 Gm. acid.

The second distillate, ice-bath flask, had 116 Cc. acid acetone 2.4 p. c. acid = 2.78 Gm. acid.

Then $4.75 + 2.78 = 7.53$ Gm. acid came over unchanged, out of 177 Gm. passed in; or, $177 - 7.53 = 169.47$ Gm. decomposed.

The acetone estimated by iodoform was 24.3 p. c. of the acid decomposed.

(6) About 500 Gm. of precipitated barium carbonate was put into the rotary still on top of the charge of pumice, and when the whole was heated 380 Cc. 60 p. c. acid = 228 Gm. of absolute acid was passed in in vapor during 3.5 hours.

The first distillate was 108 Cc. of acid water containing 3.9 Gm. acid.

The second distillate was 135 Cc. of acid acetone containing 2.7 Gm. acid.

228 Gm. acid - 6.6 Gm. over unchanged = 221.4 Gm. decomposed.

The estimated acetone was 16 p. c. of the acid decomposed.

Much inflammable gas throughout the process.

(7) About 456 Gm. of precipitated barium carbonate put into the cleaned-out rotary still, and when heated 510 Cc. of 36 p. c. acid = 183.6 Gm. absolute acid

was passed in in 4.5 hours. About 24.5 Gm. of acid came over unchanged, leaving 159.1 Gm. decomposed.

The acetone was estimated at 53.7 Gm., or about 34 p. c. of the decomposed acid.

(8) Charged the rotary still with 1,000 Gm. of dry barium acetate and distilled this acetate as long as it would yield a distillate, and until it was reduced to about 770 Gm. of barium carbonate quite free from acetate. This yielded acetone estimated by iodoform at about 60 p. c. of the theoretical quantity.

When the distillation from the acetate had ceased the receivers were changed and 490 Cc. of 60 p. c. acid = 294 Gm. of absolute acid were passed into this charge of carbonate in about 4.5 hours.

The distillate was received in 5 fractions.

1st.	37 Cc. of acid water containing	15.6 p. c. acid or	5.77 Gm.
2d.	256 " " dilute acetone "	4.4 " " "	11.26 "
3d.	230 " " " " "	9.6 " " "	22.08 "
4th.	46 " " " " "	11.0 " " "	5.06 "
5th.	26 " " " " "	17.6 " " "	4.58 "

595 Cc.

Distilled over undecomposed, 48.75 Gm.

294 Gm. — 49 Gm. = 245 Gm. decomposed.

In each of the 2d and 3d flasks was about 40 Cc. of water at the start. Then 80 from 595 gave 515 Cc. of total distillate from the 490 Cc. fed in.

Acetone required from 245 Gm. acid 118 Gm. Estimated yield 71 Gm., or 60 p. c. of the required yield.

On the following day, without having opened the still, it was reheated and 530 Cc. of 60 p. c. acid = 318 Gm. of absolute acid was passed in in vapor. From low street pressure in the gas mains the heat on this day was deficient.

1st distillate	50 Cc. acid water containing	19.6 p. c. acid or	9.8 Gm.
2d	" 255 " dilute acetone "	10.0 " " "	25.5 "
3d	" 138 " " " "	6.0 " " "	8.2 "

443 Cc.

43.6 Gm.

318 Gm. — 44 Gm. = 274 Gm. acid decomposed.

Acetone required from 274 Gm. acid 132 Gm. Estimated yield 95 Gm. or 72 p. c. of the required yield.

On the day following, again without opening the still, in about 4 hours, passed in 535 Cc. of 60 p. c. acid = 321 Gm. of absolute acid.

1st distillate, hot flask,	22 Cc. acid water containing	7.6 p. c. acid or	1.67 Gm.
2d	" ice-bath, 258 " dilute acetone "	4.8 " " "	12.38 "
3d	" " 131 " " " "	7.6 " " "	9.96 "

411 Cc.

24.01 Gm.

231 Gm. — 24 Gm. = 207 Gm. acid decomposed.

Acetone required by theory from 297 Gm. acid 143 Gm. Obtained by estimate about 113 Gm. or nearly 80 p. c. of the required yield.

Now, upon cooling and opening the still, samples taken from various parts of the contents were all found to be barium carbonate and free from acetic acid.

During the progress of these distillations from pumice stone, from carbonates and from the empty stills alike, whenever the supply of acid vapor was cut off the distillation almost instantly ceased, showing that there was then nothing in the still to decompose.

This, then, is the improved, continuous process for the production of acetone directly from the acetic acid, which avoids and saves the intermediate steps of forming and decomposing acetates.

The formation of acetates in the still was repeatedly tried with both barium and calcium carbonates, but always failed until the temperature was reduced to about the boiling point of water, or the condensing point of watery vapor, and then the acetates formed, cohered and adhered to the ribs and shell of the still, and no longer moved until again decomposed by a higher heat.

Corresponding trials were made with calcium carbonate and with calcium acetate decomposed to carbonate, with results very similar to those above given, but the barium carbonate seemed to answer best, possibly because it yields a heavier powder that occupies less space and moves better.

When commercial acetate of lime was used tarry matters obstructed the exit tubes and contaminated the distillates. The portion of these tarry matters that was reduced to charcoal in the still, and there mixed with the carbonate, seemed to be rather beneficial than obstructive. But on the whole the process appeared to do better with carbonates reduced from acetates that were made for the purpose from good materials. As the process seems to be rather a mechanical or physical one of surface contact, it would be reasonable to expect better results from reduced carbonates than from precipitated carbonates. And it is still an open question whether, on the large manufacturing scale, with better control of the essentials, heat and motion, pumice or bone black, or some other such substance, will not be better than the carbonates. Of one thing the writer is convinced, and that is that the close regulation of the heating within narrow limits of variation, is far the most important element in the process. Within very narrow limits, too little heat gives undecomposed acid, while too much gives inflammable gases in place of acetone. But on the large scale this element will be under much better control, whilst a proportionately longer still will give the acid vapor farther to go and a prolonged exposure to the limited heating and contact.

There are no patents sought for on this process or apparatus.

The dilute acetone from this process is fairly good and clean, and is colorless except for the action of the free acid contained on the iron tubing. With the free acid the s. g. by hydrometer varies between 0.93 and 0.97. No part of the distillate has more than a thin film of oil on the surface too small to be measured, and this oily surface is only in the first flask with the acid water. On further dilution of the ice-bath distillate it is rendered opalescent for a minute or two and then becomes again transparent.

This distillate (undiluted) is a good solvent for many substances, and is probably pure enough for the manufacture of chloroform.

When allowed to stand some days upon caustic lime and then poured off and rectified, it is much improved in character and strength, and is then adapted

to a still larger number of uses, and is perhaps better adapted to the manufacture of chloroform.

The product of this first rectification was then digested with about 10 p. c. of dry calcium chloride. This abstracted most of the water and settled in dense solution at the bottom of the bright yellowish acetone. This latter was separated and distilled, and again digested for several days with 10 p. c. of fresh calcium chloride, being frequently well shaken. Again twice separated and distilled from fresh portions of calcium chloride, in a capacious flask with a good Hempel tube filled with small glass marbles, and the whole apparatus filled with well-dried air, and distilled directly into specific gravity bottles, such as are described in the *Ephemeris*, Vol. IV., p. 1448—it gave six fractions, four of which had the specific gravities at $\frac{1}{3}^{\circ}$ C, as follows: First, 0.79662; second, 0.79704; third, 0.79712; sixth, 0.79793. The irregularities of these differences are doubtless due to differences in rate of boiling, yet they demonstrate conclusively that the first fraction can not be anhydrous.

Authorities differ much as to the s. g. of acetone. The lowest noticed is given by W. H. Perkins, Ph.D., F.R.S., in the *Journal of the Chemical Society of London*, 1884, Vol. XLV, p. 478. He gives the s. g. at $\frac{1}{3}^{\circ}$ as 0.79652, and at $\frac{2}{3}^{\circ}$ as 0.78669—and says this is lower than that usually observed, but agrees pretty closely with that of Linnemann, who obtained $\frac{1}{3}^{\circ}$ = 0.7975. Thorpe's number, calculated for this temperature, gave $\frac{1}{3}^{\circ}$ = 0.80244. Judging from the circumstance that the writer's fractions did not agree, and that therefore there was no constant boiling point to his distillate, and hence no part anhydrous—his and Perkin's results are both too high.

Notwithstanding this, the writer accepts, for the present at least, his own result as a basis for the following specific gravities of dilutions. His best results as obtained by the use of his above-mentioned specific gravity bottles, and a sensitive thermometer in tenths of a degree, recently compared with a standard, are as follows:

At $\frac{1}{3}^{\circ}$ C. 0.808157. At $\frac{1}{3}^{\circ}$ C. 0.796620. At $\frac{2}{3}^{\circ}$ C. 0.786988.

It was first desirable to know whether dilutions of acetone with water were mixtures, or whether, as in the case of alcohol; there was molecular combination with contraction and elevation of temperature. It was found that when 40 Cc. of acetone of about 90 p. c. was mixed with 40 Cc. of water there was a contraction of 3.2 Cc., and an increase of temperature of 5.6° C., with an effervescence of gas as in alcohol.

The proportion of 10 Gm. of recently boiled distilled water added to 90 Gm. of this distillate, mixed by connecting two flasks with the weighed quantities, and passing the liquids back and forth without exposure to external air or loss of vapor, gave the following specific gravities:

Acetone at $\frac{1}{3}^{\circ}$ C. 0.8371. $\frac{1}{3}^{\circ}$ C. 0.8260. $\frac{2}{3}^{\circ}$ C. 0.8168 for 10 p. c. of water or 90 p. c. acetone.

This method of dilution by weighing the acetone and water separately in flasks and then connecting the flasks for mixing without loss of vapor or outer air contact was adopted for the basis of an acetone table. The lines of the table that are given in heavy-faced type are given from actual observation, and the remainder by interpolation.

Acetone = C_3H_6O , or Dimethyl Ketone = CH_3COCH_3 is a transparent, colorless, mobile, light, inflammable liquid of an agreeable spirituous or ethereal

odor, with a suggestion of mint, and a sharp, biting taste. The suggestion of mint in the odor varies in strength in different samples, and probably does not belong to acetone, but comes from a minute trace of impurity. It boils at 56.3°C . (Regnault). The s. g. when very nearly anhydrous is at 4°C . 0.808157 at 15°C . 0.796620, at 25°C . 0.786988. It mixes in all proportions with alcohol and water, and is a very general solvent, dissolving many substances that are insoluble in alcohol.

ANTITOXIN.

Under this title there has been developed, during the past year, a substance which, without doubt, will place the human race in a position towards diphtheria, that it already enjoys, with the aid of vaccine virus, towards smallpox.

History.—Like many other discoveries, that of antitoxin has been one of evolution. French writers go back to the year 1888, when Drs. Hericourt and Richet announced that the blood of animals, which had been rendered immune to a poison, possessed the power of destroying or neutralizing that poison.

About four years ago, Dr. Emil Behring, of Halle, announced the discovery of the use of an immunized serum in the prevention and cure of diphtheria. Since that time, experiments have been constantly prosecuted, until, at the present time, the remedy is to be obtained in commerce. Behring has declared that Loeffler's discovery, in 1884, of the diphtheria bacillus was the first chapter in the history of antitoxin.

Dr. Roux, at the Pasteur Institute, Paris, has developed the subject, so far as the French are concerned, although he has said that the credit of first introducing this serum must be awarded to Behring.

Preparation.—The first step towards obtaining antitoxin should be denominated the preparation of *diphtheric toxin*. The latter is prepared by cultivating the diphtheria bacillus, obtained directly from a patient, in flasks of bouillon exposed to the air, at a temperature of 37°C . Usually this operation is allowed to go on for several months, in order to accumulate a quantity of the poison, but, according to Roux, who conducts the cultivation in moist air, it may be accomplished in three weeks.

The resulting solution is next passed through a porcelain filter, which arrests the bacilli and yields a clear, intensely poisonous solution.

The next step is to render the blood of some animal immune to this poison, by injecting subcutaneously small quantities at a time until the desired result is attained. The cow, sheep or goat may be used for this purpose, but, for various reasons, the horse has been selected; he is not so seriously affected by the poison; that is, he does not contract the disease; then he is usually healthy, and will yield a comparatively large quantity of blood at one time.

The treatment of the horse consists in injecting a small quantity of the toxin into the upper part of the neck, beginning with such a small amount as to produce no ill effects. If the solution is too active, its strength may be reduced by exposure, for a few minutes, to a temperature of 65° to 70° C., or it may be treated with a small quantity of solution of iodine in potassium iodide. In the course of a few days, the strength and frequency of the injections are gradually increased, and in a few weeks, the animal is able to bear large doses without injury. When this condition has been reached, the horse is bled to the extent of one to one and one-half litres; as much as ten litres have been drawn from one horse during two days, and the average for each animal varies from twenty-five to fifty litres a month. Dr. Behring has stated that a horse from which he had drawn blood at frequent intervals during four years, remained in good physical condition. After the horse has been immunized, he may be so retained by occasional injections of the toxin. As a rule, twenty days are allowed to elapse after the injection before blood is drawn.

When the blood is withdrawn, it is cooled and allowed to stand until clotting takes place, whereby the fibrin and corpuscles are removed and a clear serum is obtained.

Properties.—This anti-diphtheric serum is what is popularly known as antitoxin. It is a clear, yellowish-colored liquid, and may be concentrated to dryness in a vacuum without undergoing change. It is preserved by drying in this manner, or by the addition of carbolic acid. It is also sometimes preserved by the addition of a small lump of camphor to each bottle of the liquid. The dried antitoxin, when wanted for use, is dissolved in eight or ten parts of water.

Age is said to improve the serum, by lessening its tendency to cause in some patients a slight eruption of the skin.

Administration.—Antitoxin is administered subcutaneously from a

special syringe, which must be of a pattern that will admit of complete sterilization. Most of the serum which is produced has an immunizing power of 1 to 50,000; that is, 1 cubic centimeter of the serum is sufficient for 50 kilogrammes of body weight. The dose is 15 to 20 cubic centimeters, repeated in about 24 hours, the two injections being sufficient for most cases.

The serum employed in America has thus far been almost entirely obtained from Berlin; but several cities in the United States now have horses under treatment, so that the home supply will, no doubt, soon equal the demand.

Wherever the remedy has been used against diphtheria, the percentage of mortality has at once shown a marked decrease, and this has been so universally the case that we are forced to the conclusion that a remedy for this dreaded disease has been found.

LOEFFLER'S TOLUOL SOLUTION.

Despite the fact that antitoxin is the coming remedy for diphtheria, this solution, proposed by the discoverer of the diphtheria bacillus, is a useful adjunct in the treatment, and is also serviceable in suspicious cases, and in various non-diphtheric inflammations. The formula is as follows:

Menthol	10 grammes.
Toluol sufficient to make	36 c.c.
Alcohol	60 c.c.
Solution of ferric chloride	4 c.c.

The application is made by first cleansing the affected parts with a cotton swab, held by forceps, and then in a similar manner applying the solution with a freshly-saturated cotton swab.

Precautions must be taken against infection from the sudden coughing of the patient, which is liable to occur as a result of the application.

ARGON; A NEW CONSTITUENT OF THE ATMOSPHERE.

At a meeting of the Royal Society, held January 31, 1895, Lord Rayleigh and Professor William Ramsay presented a paper which contained the facts necessary to the establishment of a new element.

It had previously been shown by Lord Rayleigh that nitrogen extracted from chemical compounds was about $\frac{1}{2}$ per cent. lighter than that obtained from the atmosphere. He was led to study the atmospheric gases under a number of different conditions, one of which consisted in submitting a mixture of air and oxygen to the prolonged action of electric sparks; another involved the withdrawal of nitrogen from air by means of red-hot magnesium. In both cases a gas was obtained whose properties could not be reconciled with those of any known element.

To prepare argon on a large scale, air is freed from oxygen by means of red-hot copper. The residue is then passed from a gas holder through a combustion tube, heated in a furnace, and containing copper, in order to remove all traces of oxygen; the issuing gas is then dried by passage over soda-lime and phosphorus pentoxide. It then enters a combustion tube packed tightly with magnesium turnings, and heated to redness in a second furnace.

A single tube of magnesium will absorb from 7 to 8 liters of nitrogen. The temperature must be nearly that of fusion of the glass, and the current of gas must be carefully regulated, else the heat developed by the union of the magnesium with the nitrogen will fuse the tube.

Having collected the residue from 100 to 150 litres of atmospheric nitrogen, which may amount to 4 or 5 litres, it is transferred to a small gas holder and, by means of a species of self-acting Sprengel's pump, the gas is caused to circulate through a series of tubes of copper, copper oxide, soda lime, phosphorus pentoxide and red-hot magnesium turnings, until it is freed from any possible contamination with oxygen, hydrogen, hydrocarbons or nitrogen. It is preserved over mercury, or over water saturated with argon.

The solubility of the gas prepared by means of red-hot magnesium was found to be 4.05 per 100 at 13.9° ; it is, therefore, two and one-half times as soluble as nitrogen and possesses approximately the same solubility as oxygen.

All attempts to combine argon with other elements failed. It was found to be a monatomic gas and, as a monatomic gas can be only an element or a mixture of elements, it follows that argon is not of a compound nature.

From Avogadro's law the density of a gas is half its molecular weight; and, as the density of argon is approximately 20, hence its molecular weight must be 40. But its molecule is identical with its atom; hence its atomic weight or, if it be a mixture, the mean of the atomic weights of that mixture, taken for the proportion in which they are present, must be 40. It was decided to assign to argon the symbol A.

In addition to the foregoing information, Dr. William Crookes read a paper *On the Spectra of Argon*, and Dr. K. Olszewski contributed the results of his experiments on *The Liquefaction and Solidification of Argon*. Two sealed tubes of the new element were exhibited at the meeting and Lord Kelvin, who presided, Dr. Armstrong and Professor Rücker, all expressed themselves as believing that a new element of the atmosphere has been discovered. We are indebted to the *Chemical News*, of February 1st, for the above information.

THE APOCYNACEÆ IN MATERIA MEDICA.

BY GEORGE M. BERINGER.

(Continued from page 104. Conclusion).

O. Henry and Ollivier, in 1824, first obtained from *Tanghin* a fixed oil, a crystalline substance, very poisonous, and a varnish-like substance which they named *Tanguine*. J. Chatin obtained the crystals in prisms, of which the nature was not determined. In 1889 Arnaud isolated the active principle, *Tanghinine*, in crystals, and presenting the singular property of swelling up with water. It is present in the kernels to the extent of 1 per cent. It is neither an alkaloid nor a glucoside. Arnaud states that the seeds contain an abundant amount of oil, which cannot be obtained by simple expression, as an emulsion is formed with the water. He recommends the extraction with carbon disulphide. J. Chatin concludes, from his experiments with this oil, that it is absolutely inoffensive. Quinquaud observes the great excitability of the medulla by the

poison, and employed it in some toxic paralyzes, and likewise in intestinal atony and in incontinence of urine, but the symptoms indicated the danger of toxicity.

THE SEED OF CERBERA MANGHAS.—The *Cerbera Manghas* L. is a tree found in India and nearly all of Oceanica. In the various islands we find numerous varieties based on details of the flowers. The fruit is the size of a hen's egg. In the fresh state it is fleshy, with a fibrous stone, coriaceous and black at maturity, and confining a large oily kernel. According to Horsfield the pulp is employed in Java as a cataplasm in some cutaneous maladies.

The seeds and leaves are considered as very dangerous, and are stated to be drastic purgative and emetic, and too violent for use. The kernels are said to be narcotic, and produce effects comparable with those of *Datura*. M. Jeanneney, by expression, first cold and then with heat, obtained from the kernels 72 per cent. of a limpid golden yellow-colored oil, which burns with a clear flame and an odor resembling that of cocoanut oil. It is very acrid to the taste, producing a sensation of burning in the stomach, vertigo, nausea and violent purgation and colic.

THE SEEDS OF CERBERA ODALLAM.—The *Cerbera Odallam* Gaertn. (*Odallam* Rheede; *Cerbera Manghu* Lin.; *Manghas* Sims not L.; *Tanghinia Odallam* G. Don.) is a shrub or tree inhabiting the western coast regions of India. Plugge describes the fruit as a red drupe, spherical or ovoid, the size of an apple, with a stone in the centre surrounded by a mesocarp. The fruit contains generally two hemispherical seeds with a tough, horny, granular envelope. The kernel is rounded on the outside, flattened or depressed about the centre on the internal side. It is formed of two unequal cotyledons, the external surrounding the internal and a short ascending radicle. The seeds of *Cerbera Odallum* contain a colorless crystallizable glucoside *Cerberine* isolated by De Vrij. It is distinct from the *Tanghinine* of Arnaud, of which it is probably an isomer. It yields with dilute acids *Cerberetine* equally toxic and of a handsome yellow color.

The seeds contain 77 per cent. of fixed oil. *Cerberine* is very toxic, and acts by arresting heart action. It presents some of the advantages of *Digitalis*, and merits clinical study. The seeds are employed as an emeto-cathartic, the bark, the latex (rich in caoutchouc) and the leaves as purgatives, but all are dangerous.

BARKS.

NERIUM OLEANDER.—The bark of *Nerium Oleander* L. is the only one of note of this family obtained from Europe. The stem is vaguely triangular or tetragonal, depending whether the leaves are ternate or opposite. The bark is externally yellowish green in the young parts, soon becoming grayish. The internal face is greenish white, the fracture green, the latex originates especially in the internal region of the bark, which is quite thick compared with the wood. The liquid is likewise abundant in the neighborhood of the periphery of the pith, which is large, triangular or square, greenish yellow, with a green line of contact with the wood. The leaves and young stems appear absolutely glabrous. The microscope, however, shows a few hairs, very short and large, unicellular, with a small cavity.

ANATOMY.—The young bark of the stem shows: an *epidermis* with walls externally thickened, soon replaced by a zone of a few suberous layers; a *collenchyma* very clear and quite thick, with elements elongated in the direction of the axis; these contain chlorophyll and starch; a *chlorophyll-bearing tissue* with rounded thin-walled cells containing an abundance of starch. The *Endodermis* is not visible excepting near the summit of the stem. The *pericycle* is thick and contains the bundles of cellular fibres extremely long, pearly white, and with cavities very straight, often flattened; and the cells with a thin membrane with macles of calcium oxalate. The *liber* encloses not macles, but numerous rhomboids, often in longitudinal or radial series. Sometimes a number of crystals are enclosed in a single cell. *Cambium.* *Wood* rich in starch. The *laticiferous vessels* are difficult to see; we find them especially in the pericycle and in the exterior parenchyma.

THE BARK OF THEVETIA NERIIFOLIA JUSS. Generally the bark is obtained from the young branches; it is thin, delicate, strongly enrolled upon itself from one or both borders. The surface is gray, greenish or a little yellow, rarely glossy, is finely striated longitudinally, with few whitish streaks, more or less numerous elongated lenticels and scars of the alternate leaves. The internal face is bluish-black or reddish-violet, smooth. The fracture sometimes quite clear, is nearly always lengthily fibrous, with soft fibres in the liber. The length is variable, 15 to 20 c.m.; the thickness 1 m.m. or more; odorless; taste pungent, then strongly bitter.

The *anatomical structure* shows: (1) a suber formed of cells with white flattened walls; (2) a parenchyma of which the cells are tangentially compressed, the walls colored and with brownish contents; (3) a zone constituted of numerous white fibres, very long and large, and cavities sometimes quite large and flattened. Beneath this is the liber region, the color analogous to that of the cortical parenchyma, but with the medullary rays. In this tissue are the laticiferous canals filled with a substance at times granular, at other times transparent, little starch, some rhomboids of oxalate. The bark contains the same active principles as the seeds and pseudoin-dican. It is employed as an anti-periodic, febrifuge and purgative. Shortt and Bidie employed it in remittent fever with satisfactory results: a tincture (1 part to 5 of rectified spirit) in doses of 15 to 18 drops during the interval of the attack is recommended.

BARKS OF THE PLUMERIAS.

This genus is represented by tropical trees or shrubs, frequently cultivated as ornamental plants. The medical properties are due to the latex, frequently drastic and corrosive. The barks of several species are employed. The *Plumeria alba* L., a native of the Island Sante Croix, now found in all the warm regions of the Antilles, India, the Mascarene Islands, etc., is known under the French names *Frangipanier blanc*, *Bois de lait*, and the English *Jasmine-tree*. It is the *Topaiba* of the Spanish, and in India is called Arali. It attains a height of 5 to 6 m., and bears alternate leaves and handsome odorous flowers. It contains an abundance of a white poisonous juice.

The bark of this species in commerce is separated from the wood and is in very irregular strips ordinarily curved, rolled up or shrivelled, the length ranging from 10 to 12 c.m. These strips are constituted of an external envelope, papyraceous, cartilaginous, and an internal region tougher and thicker: these two parts are frequently united, but more often, however, detached from each other. The external layer is parchment-like, ranging in color, reddish brown, more or less glossy, or yellow marked with lichens, showing a few whitish streaks and black points, and the leaf scars.

The internal layer attains in old barks 3 m.m., and the internal face more smooth and dark in young barks, is brown and

quite rugose in older barks. It breaks readily, the fracture being short, non-fibrous, except in the inner zone, and with white points rather regularly marking the brown body. In mass the odor is slightly acid; taste nil near the parchment-like region, feebly pungent and bitter in the bark proper.

The bark is purgative, alterative, depurative, and given especially in blenorrhagia. It may be administered in a form of decoction or by macerating the powder in sweetened water, wine or beer. The remedy is often associated with other plants (*Aristolochia trilobata*; *Cynosurus separius*, etc). It is also given in herpes, syphilis, and, externally, in lotions upon syphilitic ulcers.

Plumeria rubra L. (*P. flore roseo odoratissimo* Tournef.; *Nerium arboreum* Sloane, etc.), the *Frangipanier rouge* is found in tropical America, Venezuela, Mexico, etc. The bark of the root is generally employed and greatly resembles that of the root of the *P. alba*, and is used in the same maladies as the bark of the latter species.

The *Plumeria phagedenica* Mart. occupies the valleys in Brazil, the indigenous name being *Sebni-iiga*. Heermeyer has described the anatomical structure of the bark (*Pharmaceutische Post*, Sept. 24, 1893). The bark is vermifuge and drastic.

The *Plumeria drastica* Mart. inhabits the Brazilian province Minas-Geraes, where it bears the name *Tiborna*. The bark is employed as a febrifuge, anti-icteric, drastic, etc.

The *Plumeria acutifolia* Poir. (*P. obtusa* Lour. not L.; *P. acuminata* Roxb.) is native of America, but extensively cultivated in the Indies. The bark has been employed against abscess, gonorrhœa and fevers. The juice has been applied to carious teeth, ulcers and wounds, and is rubefacient and anti-rheumatic.

QUEBRACHO.

The name *Quebracho* (pronounced *Québratcho*) is applied in South America, especially in the Argentine Republic, to a number of trees of entirely different families having in common an extreme hardness of the wood and being very rich in tannin. Among these we may mention *Cæsalpinia melanocarpa*, *Québracho rouge* (Leguminosæ); the *Machærium fertile* Grisb., or the *Machærium Tipa* Grisb. (*Tipuana speciosa* Benth.), (Leguminosæ). It may be the *Iodina rhombifolia* Hook et Arn, or *Québracho flojo*, a handsome Santalaceæ commonly known as *Sombra del toro*, whose bark is sometimes mixed with that

of the *Q. blanco*. The *Quebracho Colorado* is the wood of a Terebinthaceæ, the *Loxopterygium Lorentzii* Griseb. The *Quebracho Blanco* is an Apocynaceæ, the *Aspidosperma Quebracho* Schlecht (*Macagha Quebracho* H. Bn.).

The discovery of the tree known as *Quebracho Blanco* is due to Burmeister, who considered the two sorts, white and red, but two varieties differing simply in a few details, among others the color of their wood. Schlechtendal gave to the tree the name *Aspidosperma Quebracho*, but he continued the red sort under the name *A. Quebracho Colorado*. Ten years later, Griesbach recognized in the red *Quebracho* a Terebinthaceæ of the group *Anacardium* and assigned the name *Loxopterygium Lorentzii*, in honor of Professor Lorenz, of Cordoba. Many of the specimens arrived in Europe without specific name or precise information as to botanic origin, leading to serious confusion and diverse results in clinical experiments with this important drug.

All the *Aspidosperma* are from tropical America. The *Quebracho* abounds particularly in the Argentine Republic, and more especially in the district of Catamarca. It extends to the south as far as the north of Patagonia. The *Loxopterygium* seems rather to belong to the province of Corrientes.

The genus *Aspidosperma*, Mart. et Zucc., is formed of shrubs or trees of tropical America with solid wood, leaves ordinarily alternate and with small flowers in cymes, with one or two ligneous dehiscent follicles, and with seeds exalbuminous and winged.

The *Aspidosperma Quebracho* is an evergreen tree with very straight trunk, attaining the dimensions of 15 m. in height and 1.20 metres in diameter. The branches are long and flexible, recurving toward the ground, giving the tree the appearance of a weeping willow. The bark, the wood and the leaves are rich in tannin, bitter and astringent.

The bark of *Quebracho*, as collected, dried and shipped to Europe, appears in thick fragments, little bent, nearly flat, evidently collected for the most part from old plants. One writer says that the trees employed are more than seventy years old. These fragments vary in thickness between $\frac{1}{2}$ and $3\frac{1}{2}$ cc., and with the suber more or less developed.

The exterior face is very rugose, irregularly marked by deep fissures. The color varies, even in the same fragment, from grayish

brown to yellowish-brown, fawn, brick-red, etc., the tint being dull and earthy. The perider, when present, is very tough and frequently bears lichens.

The internal face is finely striated lengthwise, sometimes the striæ are sinuous. The color of this face varies also from a steel gray to a much darker fawn or even distinctly rose.

The transverse fracture is short, strongly granular and very stony; with a lens we see the fascicles of fibres come to the surface in the internal region. The vertical fracture shows these same fibres as small white lines. The taste is bitter but not extremely so.

The most interesting elements in the anatomy of this bark are the curious fibres which it bears in great numbers, but always isolated and embedded in the ordinary parenchyma. The fibres are large, elongated, spindle-shaped; the thickening very considerable in concentric zones and with small clear lumen. Each fibre is surrounded completely by an envelope of small cells forming a single layer, in which each cell contains a large rhombohedral crystal of calcium oxalate.

The chemical composition is extremely complex. The first research was made by G. Fraude, who extracted an alkaloid, *aspidospermine*. Hesse demonstrated the presence of six alkaloids in this bark: *Aspidospermine*, *Aspidospermatine*, *Aspidosamine*, *Hypoquebrachine*, *Quebrachine*, *Quebrachamine*, and a neutral body *Quebrachol*. The *Aspidospermine* of commerce is an indefinite mixture of these various bodies. Tanret thinks that some of these alkaloids are produced in the reactions from the others. He has extracted likewise two new sugars, *quebrachite* and *levogyre inosite*. The bark contains also tannin and starch. According to Huchard the action of *Aspidospermine* appears to be directed especially toward the respiratory centre. It augments the amplitude and then the frequency of the respiration, diminishes and regulates the action of the heart and lowers the temperature. Outside of this action due to the pure *Aspidospermine* all the alkaloids are antithermic, but more especially *Quebrachine*; all color the blood a vinous or currant-red, all cause an increase in salivary, intestinal and renal secretions; all are toxic, especially *Quebrachine* and *Hypoquebrachine*. The least toxic is *Aspidospermine*. They cause death by asphyxia.

Quebracho is employed in its native country as a febrifuge, and according to Schikendanz, the physicians of Tucuman esteem it as

equal to cinchona, but this reputation has not been justified in Europe. As a tonic it is of less value than many European astringents. Its antidyspnœic action renders it especially valuable in asthma, emphysema and even in phthisis.

PAO-PEREIRA.—This drug is the bark of *Geissospermum Vellozi* Fr. Allem. (*Tabernæmontana lævis* Vell., *Vallesia inedita* Guib., *Vallesia punctata* Spreng., *Geissospermum læve* H. Bn.), a tree of tropical Brazil. It is in flat or slightly-curved pieces, 15 to 20 centimetres long, 1 to 5 centimetres broad and 4 to 8 millimetres in thickness. The external surface is reddish-yellow, more or less fissured, and the internal is generally formed of thin papyraceous layers, having a tendency to strip off. The transverse fracture is difficult and unequal. The odor is very slight. Taste extremely bitter. According to Hesse, it contains two principles, the one *Geissospermine* crystalline and the other *Pereirine* amorphous. It is recommended as antithermic, antiperiodic and tonic.

OCHROSIA BORBONICA.—The bark of *Ochrosia borbonica* Gmel. This tree inhabits Reunion, Mauritius, Ceylon, Java, the Mascarenes, etc., and is commonly known as "*Yellow-wood*." The bark is ordinarily in pieces, 4 to 6 cm. long by 2 to 4 cm. wide and 2 mm. in thickness.

The external surface is nearly entirely covered with greenish or grayish lichens, is strongly ridged and brownish in color beneath the lichens. The internal face is red to dark brown, striated longitudinally and with the internal layers only slightly adhering. The fracture is clear on the outside, unequal, but not fibrous on the inner layer. M. Boissard has separated from the yellow-wood a shining white substance, crystallizing in fine needles. This substance, named *Ochrosine*, has been studied by Dr. Vinson, who writes it is tonic and analeptic. The bark is employed among the Mascarenes as tonic, stomachic and febrifuge.

HOLARRHENA AFRICANA.—The bark of *Holarrhena africana* A. DC., appeared in commerce under the name of African quinine bark and erroneously also as conessi bark. This bark is employed in tropical Africa, where it is known as "*Gbomi*," against dysentery. Externally it is brown or blackish gray, suberous and more or less covered with lichens. Internally, fawn or brownish in color, raised in irregular fibrous plates. Fracture coarse, but little fibrous; odor slight and taste bitter.

CONESSI BARK.—Conessi Bark or Tellichery is obtained from *Holarrhena antidysenterica* R.Br. In its native country it has a great reputation and is known there under the name of *Codaga-pala*. The true *Holarrhena* bark is in curved pieces of varying size. Externally it is earthy brown to a light fawn color, irregularly striated with oblique furrows. Internally, the striations are always longitudinal.

The fracture shows an external rose-colored zone, an internal zone with brownish striations. The bark is quite thick. As previously stated it is frequently substituted by products from various species of *Wrightia*, and to this is attributed the unsatisfactory results obtained in Europe. It is largely used in India as a remedy in dysentery. The bark contains the same alkaloid as the seeds, Wrightine.

DITA BARK.

Dita or *Alstonia* bark is obtained from *Alstonia*¹ *scholaris*² R.Br., which tree is very common in the forests of India. The remedy was introduced into Europe by Graham, in 1839, and Alexander Gibson, in 1853, contributed an account of the drug. The bark as it enters commerce is in more or less contorted fragments of varying size, and in thickness from 4 to 12 m.m. The external face is frequently marked with blackish lichens and in some fragments the suberous portion is quite thick; the periderm is reddish-brown. Frequently it is marked by large transverse lines and fissures and leaf-scars. The internal face shows a tough grey or brownish-grey zone. The fracture is short, granular, porous but not fibrous and yellowish-white. The microscopic structure shows the suber, (where it remains), formed of cells very regularly piled up in series somewhat tangentially elongated and at times with a reddish-brown contents. Immediately beneath the suber is a layer of small cells, nearly all of which contain a large rhombohedral crystal of oxalate,

¹The genus *Alstonia* was named in honor of Charles Alston, a professor of botany, at Edinburgh, about the middle of the last century. It consists of large trees with verticillate or opposite leaves, calyx without appendages, corolla without crown, stamens included, two carpels containing numerous ovules, two follicles elongated and seeds peltate and are rich in caoutchouc.

²The specific name *scholaris* was applied to this plant, because in the schools of India school-boards are constructed from planks of this tree, the fine grained wood being well adapted for such purposes.

Beneath this the layers of cells pass insensibly into the fundamental parenchyma formed of irregular, sinuated cells, with walls irregularly thickened and elongated in the direction of their axes. The limit of the liber portions is not very distinct. The medullary rays traverse the parenchyma in a sinuous manner and are formed of 2 or 3 rows of cells. The sclerotic elements are numerous and scattered throughout the external parenchyma and disappearing almost entirely in the liber. The laticiferous vessels on transverse section appear like the other cells except for their granular contents; on longitudinal section, they appear large and distinct.

The first analysis of Dita bark appears to have been by Gruppe, who separated a bitter non-crystallizable substance, which he named *Ditaine*. Gorup Besanez, by Stass' method separated this in a crystallized condition. Hesse and Jöbst succeeded in isolating *Ditamine*, an alkaloid, and a closely related body, *Echitamine*. Harnack obtained the *Ditamine* pure by crystallizing from ether under the name of *Ditaine crystallized*, and concluded that this was the only body present. Hesse, as a result of a later complete analysis, described the following constituents, *Echiceric acid*, *Ditamine* (alkaloid), *Ditaine* or *Echitamine* (alkaloid), *Echicaoutchine* (amorphous resin), *Echiretine* (amorphous neutral body), *Echcerine*, *Echitine*, *Echiteine* (non-crystallizable bodies).

Dita bark is greatly employed as an antiperiodic in the countries of its production, where it is even claimed to be superior to quinine and, in a number of intestinal disorders, as diarrhœa and dysentery, it has given good results. It is recommended in debility and such fevers as typhoid and puerperal, and also as a vermifuge. It is a bitter tonic, stimulant and astringent. The powdered bark is administered in doses of .3 gm. to 1 gm., frequently associated with ipecac or gentian. The 10 per cent. tincture is used in doses 1 to 4 gms.

ALSTONIA CONSTRICTA.

The *Alstonia constricta* F. von Mueller (*Tabœrnœmontana* sp. Mitch.) furnishes the *Queensland Fever-Bark* used to some extent in Europe. The bark in commerce appears to be from branches 10 to 12 cm. in diameter, and is found in curved pieces varying in length from 20 to 30 cm. and about 12 cm. wide. The thickness varies from 7 m.m. to 10 m.m., depending upon the development of the suber. The external face is yellowish-gray, marked by deep fissures. The

internal face is brown, finely striated longitudinally. The fracture is granular, short in the periderm, and although quite fibrous in the internal zone, is easily broken; the color is lighter than that of the faces. The odor is very slight. The taste is strongly bitter, slightly pungent and disagreeable. Hesse has isolated from this bark the following alkaloids, *Alstonine* and *Alstonidine*, and *Porphyrine* and *Porphyrosine* possibly alkaloidal. The analysis of Oberlin and Schlagdenhauffer indicates the presence of the alkaloids *Alstonine* crystallized and *Alstonicine* amorphous.

Hesse attributes to *Alstonidine* properties analogous at once to those of quinine and to nux vomica. The experiments of Bancroft and of Bixby prove that this drug is valuable as a tonic febrifuge and more valuable as a febrifuge than as a tonic, while the *Alstonia scholbris* is more generally employed against dysentery. The *A. constricta* is, however, a good stimulant to the nervous system. As a bitter, it is comparable with gentian. It is ordinarily administered in powder, .5 gm. per day in syrup or in tincture 4 to 8 cc. per day.

ROOTS AND RHIZOMES.

The subterranean organs, with the exception of the Apocynums of America, are relatively unimportant. They are at times swollen and tuberculous, but more often the roots are ligneous and cylindrical. The cortex presents the same general constitution as that of the stem, with usually an abundance of starch and frequently a diminution of the thickened elements (fibres and sclerotics). The oxalate and the laticiferous vessels are less abundant than in the stem. The pith is ordinarily absent.

APOCYNUM CANNABINUM.—The rhizome of the *Apocynum cannabinum* L. is commonly known as the *root* of the Indian hemp of Canada and as Bowman's root, and also as bitter-root. These vulgar names have caused considerable confusion. The plant is a perennial 3 or 4 feet high, branched with slender branches, opposite leaves, greenish-white corolla, follicles hanging, seeds have a tuft of silky white hairs at the summit. If the plant grows in the shade the bark is green; if exposed to the sun it is brown. The Indians employed it for binding on account of its fibrous nature, and hence the name Indian hemp.

The rhizome is in the fresh state 8 to 18 m.m. in diameter and frequently branched, and is quite soft. The bark is quite thick and

clearly distinct from the wood. The horizontal portion is devoid of pith; the other portion possesses a pith more or less developed and rich in latex. If collected in the spring the pith is absorbed, leaving a cavity. It is usually collected in the fall and cut in fragments, and in drying becomes hard, brittle and transversely fissured.

Schmiedeberg has separated two bodies having a cardiac action, similar to Digitalis and to Strophanthus; *Apocynine-resin* and *Apocyneine* a glucoside. To this drug are ascribed diuretic, diaphoretic, emetic, cathartic and expectorant properties.

APOCYNUM ANDROSÆMIFOLIUM L.—This plant has also a number of common names, some of which are identical with those applied to the *A. cannabinum*; such as Indian hemp, bitter-root, dogs-bane, milk-weed, etc. It inhabits generally the same region as the latter and in commerce the rhizomes of the two are frequently mixed under the name of *A. cannabinum*. The rhizome is of a reddish color, and more contorted and generally longer and less bitter in taste than the latter. The anatomical structure shows no distinguishing characters between the two species, and their properties appear identical.

JALAPA.—The root of the *Echites longiflora* Desf., inhabiting portions of Brazil, Uruguay and the Argentine Republic is said to be purgative, and likewise the leaves. Anatomically the root is remarkable for the regularity of the arrangement of the elements of the wood and bark in radial rows. The names *Jalapa*, *Yalapa* and *Yalapina* are applied in the Argentine Republic to the roots of a number of species of *Echites*.

THE MADAGASCAR PERIWINKLE.—The root of the *Vinca rosea* L. is yellowish, quite small and thin, with a relatively thick bark and yellowish wood, and with numerous rootlets. The leaves and roots are both credited with depurative, antiherpetic and vulnerative properties.

NERIUM ODORUM.—The *Nerium odorum* Solander, considered by many authors as a species, is probably only a form of *N. Oleander*. It inhabits the western base of the Himalaya mountains extending thence to the eastern part of Persia. The root is considered the most active part, but the bark, stems and leaves are also used. The root is somewhat twisted 15 to 20 c.m. in length, and 5 to 15 m.m. in diameter. The surface is reddish-fawn colored in places, longitudinally ridged with short nearly smooth striations; few rootlets;

bark relatively very thin, frequently separated from the wood and formed of two zones.

Greenish has isolated from the roots of *N. odorum* two glucosides *Neriodorine* analogous to *Oleandrine* and *Neriodoreine* analogous with *Digitaleine*: the two principles are bitter and poisonous. In India, a decoction of the stems in oil is applied externally against leprosy and other cutaneous affections, and the fresh juice in ophthalmies. The juice is said to be strongly irritant, and caustic and very poisonous and used for poisonings and suicide.

OPHIOXYLON SERPENTINUM.—The root of the *O. serpentinum* Willd., the *Rauwolfia serpentina* Benth., is described as quite large $\frac{1}{2}$ to 2 c.m. in diameter recurved, sinuate, tapering to the extremity and light brown in color. The section shows a ligneous axis yellowish white and hard, and a thin brown cortex. The odor is slight, taste strongly bitter, disagreeable, alliaceous and nauseous. The cortical parenchyma is filled with starch and the laticiferous ducts contained are filled with a brown substance. According to the investigations of Prof. Wefers Bettnick the root contains a resin, a volatile oil, tannin and a yellow crystalline substance *Ophioxylin*.¹

The specific name indicates the use to which it is applied in India against snake bites and the sting of the scorpion, being employed internally in decoction and externally in powder. It is largely used as a bitter febrifuge and extensively in febrile intestinal affections: cholera, dysentery, etc. It is also recommended as an anthelmintic and as augmenting uterine contractions in labor.

¹ The authors of the *Pharmacographia Indica* report examining this root and finding traces of alkaloid present in extracts made with petroleum ether, ether, alcohol and amylic alcohol, and state as follows:

"At present we do not offer any opinion as to whether the alkaloidal principles we have referred to in the various extracts are identical or not; we are also at present unable to state whether these alkaloids are new or merely principles which have already been described as occurring in other plants of the same natural order. An analysis of the root of *O. serpentinum*, by W. Bettnick, has been published, where no alkaloid is reported to have been found, but a crystalline body related to juglone. We feel convinced that the drug examined by Bettnick was not authenticated. Prof. Eykman has recorded the discovery of an alkaloid in an Indian species *ophioxyline*, and later still (1890) M. Greshoff has found an alkaloid giving a veratrine reaction with Frohde's reagent, thus substantiating our analysis. It is probable that as the root resembles plumbago root, Prof. Bettnick's *ophioxylin* was only *plumbagin*."

G. M. B.

WOODS.

The wood of a number of species of apocynaceæ is useful both in medicine and in industrial operations. Those of Africa and neighboring islands appear to be the most important.

STEM OF THE GUACHAMACA.—The *Malouetia nitida* Spruce, *Guachamaca toxifera* Grosourdy is a small tree inhabiting Venezuela. On incision there exudes from the cortex a white latex. The bark is the most active organ, but generally the entire branch is used. Externally it is reddish-gray, ridged longitudinally and marked by leaf scars. The bark is thin reddish, wood is reddish in concentric zones; pith is small and brown. Taste is a little acid, slightly astringent and not bitter. The cortical parenchyma is rich in resin and contains numerous groups of sclerotic elements.

Guachamanine separated by Schiffer appears to approach *curari* but in action has not been sufficiently studied.

QUEBRACHO.—The wood of the *Aspidosperma quebracho* is extensively used in South America in various industries. It was exhibited for the first time in Europe at the Vienna Exposition in 1873, and again at Paris in 1878. The name *quebracho blanco* is in allusion to the color of the wood and not to the bark. The wood contains but little tannin, and will not answer for the purpose of tanning, but is highly prized by the wheelwright and carpenter.

Aspidosperma excelsa Benth, a tree of British Guiana known as "*Yaruri*," has a light, elastic and solid wood, which is greatly used for the construction of oars.

Aspidosperma sessiflorum, Fr. Allem.—This wood is esteemed for building and carpenter-work in Brazil. The juice which exudes from incisions in the bark in drops, is caustic and bitter, and is probably very toxic. It is one of the *satin woods*. A number of trees which in the Brazilian provinces are known under the names of *Perooba* or *Paroba*, are probably obtained from other members of the genus *Aspidosperma*. Brazil appears to be very rich in these species, 39 being described. From the vulgar names it is very difficult to determine the species.

OUABAIA.—This arrow poison of the Somali tribe of Africa is prepared from the wood of an Apocynaceæ. The history of this substance is entirely recent. In 1882, De Rochebrune and Arnaud examined this drug, but their investigations were interrupted by lack of material. In 1888, Arnaud isolated from

the wood brought from Oriental Africa by Revoil, a crystallized glucoside, *Ouabaine*, and which was proved by Gley to be a heart tonic. Poisson studied the botany of the plant, and showed its resemblance to *Carissa Schimperi*, A.DC., and in the absence of flowers and fruit, classed it provisionally in the genus *Acokanthera* which G. Don in 1838 had separated from *Carissa* on account of the absence of spines. The plant being named *Acokanthera Ouabaïa*, Poiss. In 1889, Cathelainau, as a result of microscopic study, concluded that the genus *Acokanthera* agreed with *Carissa*, with but one single exception. Bentham and Hooker likewise considered these two genera as differing but very little, and Dyer thinks they should be reunited. Franchet also identifies the *Carissa ouabaïa*, with the *C. Schimperi*, A.DC., a species found in Zanzibar, among the Somali and in Abyssinia. Finally, M. Max Cornu reunites the plant with the *Arduina*, under the name of *A. Ouabaïa*, M. Cornu.

More recently Lewin has investigated the subject and distinguishes true *Carissa*, while being bitter and containing a glucoside, as inoffensive, while the true *Acokanthera* are toxic. To the three species *A. Ouabaïa*, *A. Schimperi*, *A. Deflersii*, has been successively attributed the veritable *Ouabaïa*.

Acokanthera Ouabaïa, Poiss., known under the vernacular names of *Wabei*, *Wabajo*, *Ghedulajo*, according to Schweinfurth, is the accepted species. D. Hanbury and Holmes consider it identical with the *A. Schimperi*. It is a tree attaining a height of 5 metres and inhabiting that portion of the Somali country 1,000 to 1,200 metres in altitude. Schweinfurth states that the leaves of the plant are much thicker than those of *A. Schimperi*, and have three lateral nerves instead of four or five, and are of brown color.

A. Schimperi B et H. (*Strychnos abyssinica* Hochst.; *Carissa Mpte* Hochst.; *C. abyssinica* R. Br.; *C. Schimperi* A. DC.) the "Mptah," "Mupta," "Maktat," "Mepti," "Menbtchen," etc., occupies a large surface of oriental Africa to about 1,800 metres altitude. The leaves are entirely glabrous, shining, and flowers without odor, often rose-colored.

A. Deflersii Schw. This species inhabits the region in Africa around the Red Sea, and extends throughout Yemen in Asia at an altitude of 600 to 1,000 metres. According to Schweinfurth the leaves are rough in the lower surface, especially the midvein and the flowers are larger and pure white. In these three species the wood appears to be identical.

The drug is constituted of fragments of wood obtained from the stem, but the root is equally active. They attain 3 to 5 c.m. in diameter. The bark is 1 to 1.5 mm. thick, greyish yellow in color with silvery appearance in spots. It adheres closely to the wood, but the suber can be easily scratched off. Externally it is longitudinally ridged and somewhat scaly. The fracture is brownish, taste is peculiar and persistent.

The wood is very hard and compact, yielding a clear, bright section without pores; the concentric zones scarcely visible; the pith is very small quadrangular and eccentric. The color is a pale yellow and clear on fresh section, deeper ochre-yellow on old surfaces, and quite dense, odorless and having very little taste. Ligneous fibres very abundant; the vessels are relatively few in number and quite small. The medullary rays consist of one or two rows of cells which frequently contain crystals of calcium oxalate. The decoction of the wood yields a green coloration after twelve to forty-eight hours, which lasts for several days. A green fluorescence is also produced by sulphuric acid in either solutions of *ouabaine* or in decoctions of the wood.

Arnaud, in 1888, separated a white crystallized glucoside, the *Ouabaïne*, which is inodorous and not bitter, or but very slightly so in comparison with the wood. Its formula differs from that of *Strophanthine* by CH_2 . It has been found by the same chemist in the *Strophanthus glaber* of Gaboon. The wood and the root contain about 3 parts in 1,000.

Lewin has separated from *A. Schumperi* A. DC. a product different from the *Ouabaïne* of Arnaud, which he named *amorphous Ouabaïne*. He likewise separated an oily substance readily solidified *Carissol*. From the bark he separated impure *Ouabaïne*, and a very bitter, non-poisonous substance *Carissine*.

The toxicity of the wood of the *Ouabaïa* is demonstrated by usage to be the same as that of the arrow poison. For the latter purpose the aqueous extract is made into balls, and a small amount is spread on the extremity of the arrows; 5 to 10 m.gm. being sufficient to kill a rabbit. The physiological action seems to be similar to that of *Strophanthine*, only many times stronger. On the conjunctiva of animals it produces anæsthesia, but according to Panas it is inactive upon the human. According to Lewin this anæsthesia of the cornea is much slower but more perfect and durable than

that of cocaine. The *Amorphous Ouabaine* is toxic in the dose of 2 m.gm. per kilo in the rabbit, and 3 to 5 m.gm. in the pigeon. *Carissol* is said likewise to be toxic.

The extremely small dose allowable renders the employment of *Ouabaine* in medicine very difficult. Its use at present appears to be restricted to the treatment of whooping cough. The dose is one to two-tenths of a milligramme.

CARISSA XYLOPICRON Dup.-Th. The *Carissa coriacea*, Wall.; the Bitter-Wood of Bourbon, *Bois d' absinthe*. The wood appears in the market in pieces with or without the bark, and is used in cups, etc., the same as the wood of *Picræna excelsa* or the *Ochrosia borbomca*. The wood is of an orange or yellowish-white color, odorless, very bitter and a persistent aftertaste, and colors the saliva yellow. It has a reputation as a bitter tonic, febrifuge and stomachic and also as a vermifuge.

HERBS AND LEAVES.

LEAVES OF THE ROSE LAUREL.—These leaves are at times opposite, but the more frequently verticillate in threes about the young branches. They are rigid, tough and coriaceous, on short petioles. They are lengthily lanceolate, margins entire, attenuated at both extremities, the point acute. The upper face is a deep green, dull; the lower surface is somewhat brighter. The midvein is prominent with numerous very fine secondary veins. The leaves are quite acrid and bitter.

According to Schmiedeberg they contain three glucosides, *Nerein* which he considered identical with *Digitalein*; *Neriantin* and *Oleandrin*. The therapeutic action appears to be that of a heart tonic and more distinctly diuretic than *Digitalis* without accumulation, and is likewise said to be useful in dyspnœa, œdema and palpitations. It is likewise frequently used in certain cutaneous affections as an antipsoric and parasiticide.

PERIWINKLES.—The various species of *Vinca* that are recognized as interesting medicinally are *Vinca minor* L., *V. major* L., *V. media* Link et Hoffm., *V. acutiflora* Bertol., *V. herbacea* Waldst et Kit. These may be substituted one for the other without any great disadvantage, but the two first mentioned are the most important. They are said to be bitter and astringent and serviceable as vulneraries and are slightly laxative. They have also been recommended in leucorrhœa. No active principle has yet been isolated.

ALLAMANDA CATHARTICA L., all the Allamanda are energetic evacuants. The *A. cathartica* is a native of Guiana, where the leaves are commonly employed as a purgative. The *A. Schottii* Pohl. of Brazil has similar properties.

ECHITES SUBERECTA Jacq.—A plant of the West Indies, especially Jamaica, and introduced into the Bahamas. Bowrey has analyzed the plant and isolated *Urechitine* a very toxic, crystalline glucoside; *Urechitoxine*, likewise a toxic glucoside, acrid and crystalline or amorphous. These two bodies are extremely active cardiac poisons and their therapeutic application does not appear permissible. The plant is stated to be used for criminal poisonings by the negroes.

The leaves of the *Echites biflora* Jacq. of Central America and the Antilles is stated to be purgative and applied topically to scrofulous ulcers. The leaves of *Echites longiflora* Desf. of the Argentine Republic are strongly purgative and in infusion are employed against hæmorrhoids and used also in cataplasm.

ASPIDOSPERMA QUEBRACHO Schlecht.—The leaves of this tree are verticillate in threes, deep green, lanceolate, subsessile, coriaceous, smooth and terminated as in many of the species of this genus by a sharp point. They are said to contain 27.5 per cent. of tannin and to be employed in the industries.

GEISSOSPERMUM VELLOSI Fr. Allem.—The leaves of this plant are extremely bitter. They contain *Percirine*, but in less quantity than the bark and seem to be but little used. They are lanceolate, attenuated at the base and short petiolate and prolonged into a long point at the summit; borders undulate, entire; the surface smooth and shining; greenish or brownish, brighter but less glossy beneath.

CAOUTCHOUCS AND GUTTAS.

The products formed by coagulation of the latex of the apocynaceæ nearly all *caoutchoucs*, but some are true *guttas*.* The number of apocynaceæ containing caoutchouc is considerable, but only in com-

* Caoutchouc and Gutta Percha are two substances very similar, differing only in a few points. At the ordinary temperature Caoutchouc is elastic, Gutta is solid. On warming, the caoutchouc becomes adhesive, but remains elastic; the gutta becomes malleable and plastic, but not elastic. With prolonged action of heat and air caoutchouc is transformed to a sort of pitch, gutta becomes brittle and resinous. Ether readily dissolves caoutchouc, and is a poor solvent for gutta; with oil of turpentine the solvent action is reversed. Sulphur combines readily with caoutchouc and but poorly with gutta.

paratively few are the products utilized or of commercial importance. They are, for the most part, obtained from the stems of climbing plants. The solidification is sometimes allowed to take place naturally, but generally by concentrating by exposure to the sun or by fire. Rapid coagulation has the advantage of preventing from the beginning injurious fermentation, which develops disagreeable odors in the caoutchouc and alterations, and yields a product harder, more dense and containing less water. Coagulation can also be produced by chemical means, as by acids (sulphuric, nitric, tartaric or lemon juice, etc.) or by sodium chloride, sea-water, alum, etc. Coagulation by heat is usually preferred, and during the operation it is necessary to strongly compress the product.

For the most part the American caoutchoucs are excellent for industrial purposes; their resistance, their toughness and their considerable hardness is much appreciated, and equatorial America furnishes alone the best caoutchouc for all the rest of the world.

All the caoutchoucs of Mexico, Central America, Columbia Guiana, Ecuador, and likewise a large part of that from Brazil, are exclusively furnished by Euphorbiceæ (*Hevea*, *Siphonia*, etc.) or by Urticaceæ (*Castilloa*, *Cecropia*, etc.) The *Hancornia speciosa*. Gomez is, with one or two closely allied species, the principal caoutchouc yielding Apocynaceæ of America. It yields the varieties known as *Pernambuco caoutchouc*, *Maranham Caoutchouc*, and *Bahia Caouthouc*. The first appears in plates varying in thickness from 0.5 to 7 c.m., of a rose color and an efflorescence of alum on the surface. Its quality is very inferior to that of Para or of the Malay caoutchoucs. The Maranham Caoutchouc is deeper in color, like wine-lees, with brown marbling. The surface is smooth, non-efflorescent, harder and less porous, and contains less water. It is probably coagulated by sulphuric acid. The Bahia Caoutchouc is said to be produced from the variety *minor* of *Hancornia*. It is rare and of but little value, possessing none of the excellent qualities. It contains much water and foreign substance and a certain quantity of non-solidified latex. It is in masses or large plates, rose-colored, and is probably prepared by spontaneous coagulation.

The caoutchoucs of Africa are furnished almost exclusively by two genera of Apocynaceæ, the *Vahea* and the *Landolfia*, which many botanists consider under one genus. A few *Ficus* and some *Asclepiadeæ* may produce a little of the gum elastic, but generally

this is not appreciable and the true caoutchoucs of Africa are furnished by these Apocynaceæ. The *Vahea tomentosa* Leprieur, furnishes a large proportion of the Senegal caoutchouc. The *V. Senegalensis* A. DC. likewise is said to yield a large quantity. These lianes are of small diameter and greatly entangled and the most usual method of collection is to cut them and collect the juice, which flows very rapidly. Each plant yields 3 to 4 kilos of caoutchouc. The solidification is accomplished by water containing acids or salt in solution. In the interior of the continent, the coagulation seems to be accomplished by sun heat and the product made into balls with ashes. This caoutchouc enters commerce generally in plates weighing 130 to 150 gm. blackish externally, and grayish within and containing a large proportion of water, or in balls, more highly esteemed and freer from impurities, varying from 8 to 60 gm. and united in groups of from 15 to 20, and these are of a rose color.

The *Landolfia Heudelotii* A. DC. and the *L. Owariensis* Pal. de Beauv., are important as caoutchouc producing plants. They inhabit the western side of tropical Africa and the latter plant is said especially to produce the caoutchouc from Sierra-Leone, which appears in balls, mostly of a slate color internally. The *Landolfia florida* Benth, occupies an altitude of 2,500 feet and is found also in Mozambique and is the source of a large amount of caoutchouc. The caoutchouc of Gaboon is undoubtedly derived from the two last-named plants. It appears in masses, white upon cutting, quite consistent, containing much water and but little foreign matters. It is readily purified and then remains firm and resistant. It is estimated that from the French colonies there is annually exported 400 tons. The *Landolfia Kirkii* occupies the oriental regions of Africa, especially Zanzibar and Mozambique, being the "Matire" or "Mtiri" of the natives. It is the most important species of this region and its latex solidifies spontaneously so readily that artificial coagulation is unnecessary. The exportation of this product in 1879 was valued at 1,125,000 francs. The *L. Petersiana* inhabiting the same region is characterized by an extremely fluid latex, the coagulation being secured by acids or by fire.

The caoutchoucs of Madagascar are furnished by *Vahea madagascariensis* Boj. *V. gummifera* Lamk, and *V. Comorensis* Boj; and are coagulated by acids, lemon juice being mostly used.

In India several species of *Willughbeia* are said to yield caoutchoucs. The *Alstonia scholaris*, the source of Dita bark, is said to yield a gutta of poor quality. In the region of Indo-China a number of species yield caoutchoucs generally of little value.

The only *Apocynaceæ* of Oceanica important in this respect is the *Urceola elastica* Roxb. This plant and the Asclepiad, *Calotropis gigantea* furnish nearly all of the caoutchouc of Borneo and is likewise known as white Assam caoutchouc. The *Urceola* is a tree about 10 c.m. in diameter and the latex is extracted by making a V-shaped incision as far as the cambium.

PINEAPPLE CULTIVATION IN THE INTERIOR OF FLORIDA.

The question is frequently asked us: "Can pineapples be successfully grown in Lake County?" We unhesitatingly answer, they can. Many are grown, but generally in small patches, here and there, of which little is known except to the individual growers; yet sufficient to demonstrate the adaptability of our soil, and showing that with the same treatment they require elsewhere success is equally certain. We give below a few facts concerning the plant and the mode of culture in the interior of the State.

Although the lower Indian River and Lake Worth region is the great pineapple district of Florida, yet there are other portions of the State where much attention is now being given to pineapple culture. In the vicinity of Orlando the industry has probably made the greatest advancement, although possessing no greater natural advantages than many other portions of South Florida. The best results are reached in this region by growing the plants under a grating cover, which affords protection from occasional frosts and strong winds, and shuts out some of the summer sunshine. The cover is made of narrow boards placed a few inches apart on stringers and supported by posts at an elevation sufficient to allow persons to walk upright under it. The sides of the sheds on the north and west are weather-boarded in order to further protect the plants from cold winds. The cost of such sheds varies from \$300 to \$500 per acre.

Near Orlando there are three large pineries—Russell's Fairview and Modela Park. The latter is the largest covered pineapple field in Florida, and probably the largest in the world. It contains six acres and about 60,000 plants.

Pineapples grown under cover average much larger in size and have a better flavor than those grown in plantations, and hence command a better price. They generally net the shipper from 15 to 30 cents each. Six thousand apples sold from the Fairview pinery last year brought \$1,200. The suckers, however, produced by this pinery, which are in great demand for planting, were much more profitable, nearly \$8,000 having been realized from their sale.

While the pineapple ripening season in the Indian River region is from April to September, in interior Florida it is not strictly confined to these months, as,

under cover, the flowering, and hence the fruiting of the plant, can be to some extent controlled. There is hardly a month in the year when ripe apples cannot be picked from the covered pineries. Grounds bordering lakes are favorite pinery sites. The plant requires frequent fertilizing to insure good and large fruit. Cotton seed meal is considered one of the best fertilizers for pineapple plants.

A few facts concerning the pineapple plant botanically considered may add interest to this article. Not many years ago many people who had not studied the subject thought that it was a parasite growing on pine trees, and that the fruit was grown in its aerial position. This idea may be accounted for by the fact that the fruit resembles the pine cone (it was so named from this resemblance), that the pineapple belongs to the botanical family, Bromellaceae, of which the long moss is a member, and that botanists say that all plants of this family are capable of "living on air alone." The pineapple plant has long, serrated, sharp-pointed rigid leaves, springing from the root of the plant, and from the centre of the leaf cluster a short flower stalk growth, bearing a single spike of flowers and a single fruit. In the development of the fruit each flower and the bract accompanying it become thickened and fleshy, and this causes a crowding or growing together of the mass forming a single fruit covered with berry-like projections—the withered tips of the remaining petals. It is these petal tips that give the fruit the appearance of being covered with eyes. The plant grows to the height of from three to five feet.

CALCIUM PHOSPHOGLYCERATE.

This compound has attracted considerable attention in France; a formula for its preparation was given in this journal, 1894, p. 383.

A number of forms for its administration have been suggested, of which the following appear to have the preference:

Solution of Calcium Phosphoglycerate.

Calcium phosphoglycerate	10 grammes.
Distilled water sufficient to make	1,000 cc.
Dissolve and filter.	

The solution is not entirely clear, but may be made so by the addition of a trace of citric acid.

Syrup of Calcium Phosphoglycerate.

Calcium phosphoglycerate	10 grammes.
Citric acid	1 gramme.
Granulated sugar	610 grammes.
Water	340 "

The salt and acid are dissolved in the water, the sugar is added and dissolved without heat; the product weighs about 950 grammes, which may be brought to the weight of 1,000 grammes by the addition of syrup of orange.

EDITORIAL.

THE SUPPRESSION OF THE NOSTRUM TRAFFIC.

The editor of the *Medical News* (February 9, 1895) comments as follows :

In contrast with the efforts on the part of some members of the American Medical Association, as representative of the medical profession, to exorcise certain salutary restrictions from the code of ethics, are the numerous indications of a disposition on the part of the dental profession to elevate its standard both ethically and educationally. While certain men in the medical profession look upon nostrums with indifference, if not with encouragement, the dentists are discussing measures for the suppression of unethical practices of all kinds.

The foregoing remarks refer to the indiscriminate use of various cocaine preparations for the relief of diseases of the teeth and gums, the manufacturers claiming in most cases that the preparations are harmless.

It is suggested that dentists and physicians might well join hands in an effort to enact and enforce salutary legislation.

As pharmacists, let us ask ourselves how we stand in this matter. Are we endeavoring to get out of this slough, or are we to remain the tool of the nostrum manufacturer?

SERUM THERAPY.

This is a subject which, sooner or later, is bound to effect every pharmacist, but whether it will interest him pecuniarily or not cannot at present be determined. He must either furnish the various substances used in this form of medication, or lose his prestige as a purveyor of remedies. The present indications are that the various serums will be sold in original packages, in which case probably no skill will be required to dispense them, and we may see them offered for sale, very much as patent medicines are now, by any one who chooses to sell them ; or, as is usually the case with vaccine virus, the physician may prefer to supply himself directly from the manufacturer, in which event it may be safely predicted that the latter will offer every inducement.

That pharmacist who has a knowledge of bacteriology will be in a better position to intelligently judge such serums as may be required of him, than his less fortunate brother who has no knowledge of the use or value of his remedies.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

BULLETIN VOL. II, No. 2. College of Agriculture, Imperial University of Japan.

No. 1 of this bulletin was noticed in this JOURNAL (1894, p. 412), and the leading article in this number is the continuation of the subject, "The Energy of Living Protoplasm," by Dr. Oscar Loew. The author presents some interesting theories concerning the formation of proteids in plant cells, he adds many facts in support of his theory of active albumen, and thinks this theory has reached the stage when men say there may be something in it.

The other papers in this number are : "On the Vegetable Cheese, Natto," and "On the Poisonous Action of the Hydroxyl-derivations of Benzol upon Yeast and Bacteria," by K. Yabe ; "On the Quantity of Wood-gum (*xylan*) Contained in Different Kinds of Wood," by J. Okumura ; "On the Reserve Protein in Plants," by G. Daikuhara ; "On the Occurrence of Mucin in

Plants," and "Mannane as a Reserve Material in the Seeds of Diospyros Kaki, L.," by J. Ishii; "Mannane as an Article of Human Food," by C. Isuji.

LES TABACS ET TOUBEKIS GRECS. RAPPORT PRÉSENTÉ AU CONGRÈS INTERNATIONAL DE CHÉMIE APPLIQUÉE (BRUXELLES 4-10 AOUT 1894.) Par A. K. Dambergis. Athens, 1894.

The foregoing report to the International Congress of Technical Chemists held at Brussels, August, 1894, treats of Grecian tobacco from a chemical standpoint. We find that Greece is, to a certain extent, a producer of tobacco for many of the other European countries, the exports in 1893 amounting to 2,597,740 kilos. The results of the chemical analyses of the tobacco from the various Grecian provinces are tabulated in an instructive manner.

THE PHARMACOLOGY OF COLA ACUMINATA. Third edition of Parke, Davis & Co.'s "Working Bulletin," on the subject of Kola. One object of this bulletin is to show that Kola is by no means a new remedy. It contains two well-executed colored plates and much valuable information, but we are still looking for something more recent, concerning the chemical constituents and therapeutic action of this drug, than the monograph of Heckel and Schlagdenhauffen.

SWEET CASSAVA; ITS CULTURE, PROPERTIES AND USES. By Harvey W. Wiley, Chemist of the U. S. Department of Agriculture, Bulletin No. 44.

OBITUARY NOTICE OF JOHN M. MAISCH. By Charles S. Dolley, M.D. Read before the American Philosophical Society, December 7, 1894. This contribution is especially valuable, as it gives a complete list of Professor Maisch's contributions to science. They number over 250, and extend from the year 1854 to within a few months of his death.

UEBER EINIGE FLECHTENSTOFFE; NOTIZ ÜBER CHRYSOPHANSÄURE; AND NOTIZ ÜBER DIE PEREIRORINDE VON O. HESSE. Reprints from *Liebig's Annalen*.

RESOLUTIONS adopted by the closing meeting of the VIII International Congress of Hygiene and Demography, held at Budapest, September 9, 1894.

THE SHAW GAS TESTER FOR DETECTING THE PRESENCE AND PERCENTAGE OF FIRE DAMP AND CHOKER DAMP IN COAL MINES, ETC. By Joseph R. Wilson. A paper read before the Federated Institution of Mining Engineers at the Annual General Meeting, Newcastle-on-Tyne, September 5, 1894.

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA. Containing the papers read before the College from January, 1894, to December, 1894, inclusive. Philadelphia. 1894.

BOYD'S BUSINESS DIRECTORY OF PHILADELPHIA FOR 1895. Published by C. E. Howe & Co., southwest corner Eighth and Locust Streets, Philadelphia.

THE CALENDAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

WARNER'S THERAPEUTIC READY REFERENCE BOOK FOR PHYSICIANS. Philadelphia. W. R. Warner & Co. 1895.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 19, 1895.

The meeting was called to order by appointing Prof. F. G. Ryan Chairman. On motion the reading of the minutes was dispensed with.

The Registrar announced that there had been received as donations since the last meeting the following works:

Les Drogues Simples d'Origine Végétale, by MM. Planchon and Collin. From Octave Doin.

Bastin's Laboratory Exercises. From W. B. Saunders.

Extent and Character of Food and Drug Adulterations. Proceedings of the Eleventh Annual Convention of the Association of Official Agricultural Chemists. U. S. Department of Agriculture.



U. S. Consular Reports for 1894.

U. S. Civil Service Commission. Tenth Annual Report.

U. S. Bureau of Education.

Mr. L. F. Kebler read some notes on beeswax and various adulterations; conspicuous among the variations are those of the specific gravity and acid numbers; the principal contaminations being paraffin and earthy materials, the latter to make its specific gravity nearer to normal. When paraffin is used to any large extent, the surface of the mixture will always show a concavity of marked character.

Petrolatum was also reported on and he had examined nine samples, but one of them was closely within the requirements of the Pharmacopœia. Where vegetable or organic matter was the contaminant, the French chemists relied upon a saturated solution of permanganate of potassium, used in the proportion

of 5 drops of the solution to 5 grammes of the suspected article; they should be thoroughly triturated in a glass or porcelain mortar; if the petrolatum is uncontaminated with organic matter the color remains as normal, but in the presence of organic matter it turns chestnut-brown.

Rock candy syrup was also reported on. This is generally thought to be the residue from the manufacture of rock candy, evaporated to a proper consistence. Samples that had been examined showed considerable variation, some containing notable amounts of uncrystallizable sugar. Some manufacturers make it from granulated sugar by solution in water and bringing it to the specific gravity of 1.32. One manufacturer claimed that he used 1 ounce of salicylic acid in 500 gallons of syrup.

A label cabinet of neat and thorough workmanship was exhibited. The design, as shown by the accompanying figure, is novel and well calculated to answer the object for which it was designed; the drawer is divided from front to back with strips of wood, making spaces slightly wider than the labels. A ribbon of nickel-plated metal, the exact width of the divisions, is secured to the front of the drawer and made into curves slanting from the top of the front of the drawer all the way to the back, so that the labels lie at an angle of nearly 45° to the bottom of the drawer. This enables one to take any label out of its appropriate place with great ease. Screws are arranged by which any shrinkage of the wood may be taken up very readily and exactly.

The question of methods to prevent accidents in dispensing prescriptions was brought up for discussion. The general opinion was that no mechanical contrivance could be relied on to prevent mistakes. Constant vigilance is the only method to avoid errors.

Dr. Miller said it was his rule to insist upon the patient's name being placed upon the prescriptions, and if for external use it be also indicated in the directions to be placed on the label.

There being no further business, on motion adjourned.

T. S. WEIGAND, *Registrar.*

NOTES.

C. Uffelmann and A. Börner (*Zeit. für angewand. Chemie*, **23**, 710, through *Analyst*, **20**, 42) have analyzed ten samples of Kola nut, varying in price from \$1 to \$5 per pound, with the following average results:

	Per Cent.
Water	13.35
Total nitrogen	1.53
Caffeine (including theobromine)	2.08
Ethereal extract	1.35
Starch	45.44
Tannin	3.79
Cellulose	7.01
Other non-nitrogenous matter	18.21
Mineral matter	2.90

In spite of the great difference in price, the different specimens showed a great similarity in composition.

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